THE IRON AGE

A Review of the Hardware, Iron ... des.

Published every Thursday Morning by David Williams Co., 232-... am St., New York.

Vol. LXIII: No. 20. *New York, Thursday, May 18, 1899.*

$4.50 a Year, including Postage.
Single Copies, Ten Cents.

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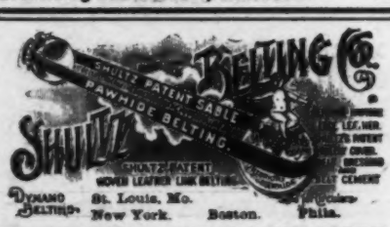

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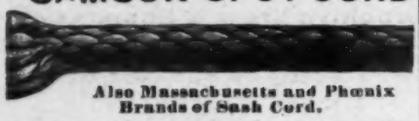

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" " post "	11, "	35.00	385.00
" " forfeit "	16, "	10.00.....	160.00
Total, - -	278		$6,820.00

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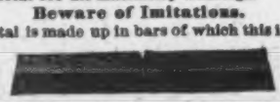

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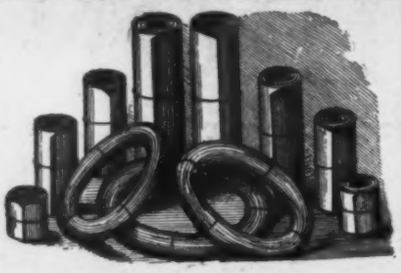

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THE IRON AGE.

THURSDAY, MAY 18, 1899.

The Heyl & Patterson Casting Machine.

Heyl & Patterson of Pittsburgh, Pa., have designed and built for the Cambria Steel Company of Johnstown, Pa., a pig iron casting plant, the principal features of which are shown in the accompanying engravings. The Johnstown plant, which is a double one, was put in successful operation in the early part of February, the capacity being 1500 tons in 24 hours. Heyl & Patterson have under contract now plants for the Palmer Ship Building & Iron Company at Jarrow-on-Tyne, England, and for the National Steel Company at the Youngstown furnaces of the Ohio Steel Company, now building. As is shown in the engravings the apparatus consists of a steel frame combining a water tank and upper and lower parallel tracks, a pair of chains carrying pressed steel molds or pans, into which the liquid metal is poured from the ladle through intervening runners so arranged that the stream to two or more lines of molds can be equalized. The general arrangement is indicated in Fig. 1, a general elevation. The iron is poured from the ladle into the molds while they are traveling toward the left at such a level as to be partially immersed in water. In this manner they continue to travel for a sufficient length of time to allow the metal to set. Then the molds are submerged, as is shown in Fig. 2, traveling for a considerable distance through the water tank to cool them enough to allow the pigs to be loaded on wooden cars. The molds are carried up a considerable incline in order to discharge the pigs at a sufficient hight to load in railroad cars. It is entirely practicable to make this grade steeper and attain a much greater hight if desired. Fig. 3 shows the head or discharge end. The two strings of molds are driven from a pinion shaft, each pinion being equipped with a friction clutch. One or both conveyors may be operated at pleasure.

At the head end the molds are inverted and finall pass over two furnaces, whose position is shown in Fig. 1, and whose general appearance is indicated in Fig. 4. They are mounted on wheels, so that they may be withdrawn when it is necessary to stop the machinery for short periods of time. Gas, coal or crude oil is used as a fuel, and since the molds are still damp when they reach the furnace a heavy deposit of soot or carbon adheres to the inner surface and the lips of the molds. The point is made that owing to this deposit of soot molds with large overhanging lips can be used, since the deposit of carbon prevents the molten iron, which falls on the lip as it passes through the stream, from adhering to or chilling, so that the pigs are all freely discharged at the head end. The advantage of molds with long overlapping lips is that there is an allowance for considerable wear at each joint in the chain before it becomes necessary to replace the links. The chain links are 24-inch pitch with

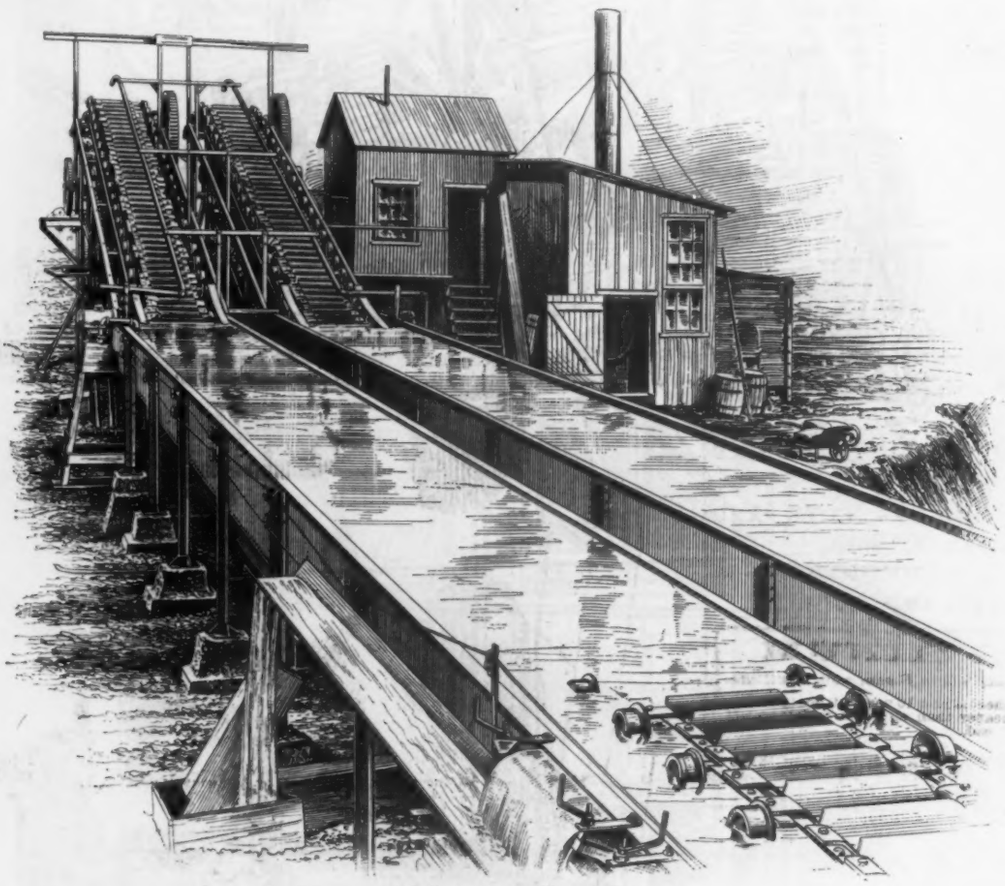


Fig. 2.—View Toward Discharging End.

THE HEYL & PATTERSON PIG IRON CASTING MACHINE.

2 inches diameter through the axles, which form the pins of the chain, and 8-inch chilled traction wheels on the ends of the axle. The power required for the Johnstown plant when running at full capacity is 14 horse-power.

The British Columbia Mineral Output

TORONTO, May 16, 1899.—J. Fred. Hume, Minister of Mines for British Columbia, has just issued his report for 1898. It is a somewhat bulky volume and contains besides the statistics of production an account of developments which have not yet reached the productive stage. It is liberally illustrated. The total value of the mineral output for the year amounted to nearly $11,000,000, the actual figures being $10,906,861, as against $10,455,268 in 1897. To this sum the largest contribution was made by the coal mines of the provinces, their product being valued at $3,407,595, as against $2,648,562 in 1897. Never before did the coal mines make so great a showing, either in quantity or value. Of the 1,135,865 tons produced, all but 9334 tons from the Crow's Nest Pass came from the collieries of Vancouver Island. The Crow's Nest Pass mines had just become producers when the year closed. They will figure largely, it is expected, in the present year's output as they are opened, as there are many coke ovens now lighted in their vicinity, and as there is railroad communication between them and the gold and silver lead camps of West Kootenay. Next to coal comes gold, the yield of which is valued at $2,844,563, as against $2,636,340 in 1897. Silver follows, with a valuation of $2,375,841, as against $3,272,836 in 1897. The lead output is valued at $1,077,581, as against $1,390,517 in 1897. The decline in these two metals, especially marked in silver, is attributed by the provincial mineralogist to the drop that took place in silver during the latter part of 1897 and the beginning of 1898. Though the price rose when the war between the United States and Spain was far advanced it was too late to begin operations for the season. Following upon the increase in the American lead duties the drop in silver told severely, not only upon several working mines but also upon the development of many claims. Also the gold output was kept down, but by another influence, which operated as well against the silver lead mines. The influence in question was the expectation of early direct railway connection with the East and with the coal mines of the Crow's Nest Pass, through the extension of the Canadian Pacific Railway. As that line was expected to be the means of effecting great economies in the cost of production, owners of properties slowed down or altogether deferred the development work, which could be done so much more cheaply in a few months. Thus there was a comparatively restricted output of all metals in the Kootenay district. Now that the road is built and so many properties have been brought to the eve of production it is believed that 1899 will show a very great increase over 1898. Copper showed a large gain, there being 7,271,678 pounds produced in 1898 at a value of $874,871, as against 5,325,180 pounds in 1897, valued at $266,258. Thus, though the increase in quantity was less than 50 per cent., the increase in total value was more than 300 per

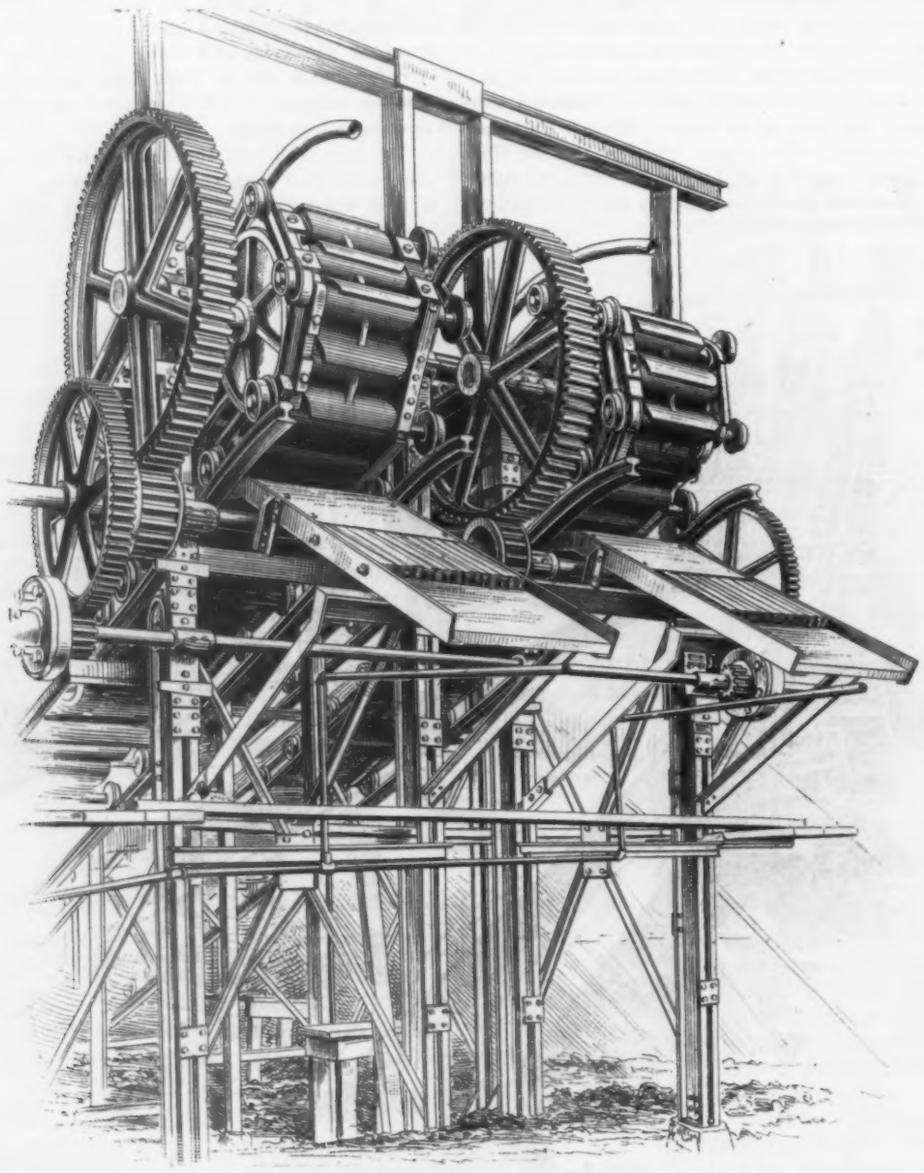


Fig. 3.—View of Discharge End.

THE HEYL & PATTERSON PIG IRON CASTING MACHINE.

cent. Of the mining divisions Slocan, the great silver lead camp, remains the most productive, its output being valued at $2,619,852, while that of Trail Creek (Rossland), valued at $2,470,811, comes next. Though silver and lead both show a great falling off from the figures of 1897 the output of the silver lead ores still exceeds that of all other ores, its aggregate value being $3,453,422. Of the 1,802,373 tons of coal imported into California in 1898, 651,208 tons were supplied by British Columbia.

An idea of the economy which will be realized in the treatment of the Kootenay ores and which will thus stimulate mining operations is afforded by the following comparative figures: In the past the freight rate on coal and coke from the coast to Nelson has been $5.25 per ton; now the freight rate from the Crow's Nest Pass to Nelson is only $2.25 per ton. Heretofore coal laid down from the coast cost $10 per ton at Nelson; now, laid down from the Crow's Nest Pass, it costs only $5.75. Similarly coke has been reduced from $11 to $7 per ton. At Fernie, in the Pass, 30 bee-hive coke ovens have been built. It is the intention to erect 200 in all. As to the quantity of coal in the Crow's Nest deposits, the provincial mineralogist shows that there are three series of seams. In the first, the Elk River basin, there are 12 seams of bituminous; in the second, the Michel Creek basin, there are 7, also bituminous; in the third there are 15 seams of cannel coal. The Elk River seams vary in thickness from 3 to 30 feet. In the Elk River basin alone there is an available tonnage estimated at 16,443,900,000 tons. The total deposits of all the seams of the pass will doubtless amount to several times this quantity. But the known deposits of the coal area exposed at the Pass are believed to be but a small part of the whole. "There is every reason to believe," says the provincial mineralogist, "that future prosperity will prove the possibly productive area to be practically of unlimited extent." As to quality, analyses 0.78 per cent. water, 20.24 per cent. volatile matter, 76.25 per cent. carbon and 2.73 per cent. ash. The superintendent of one of the largest smelters is quoted in the report as saying that he could accomplish as much with 135 pounds of Crow's Nest coke as he could with 150 pounds of any other cokes he had used. C. A. C. J.

New Lake Copper Explorations.

The Wisconsin State Government has authorized a State geological survey of the westerly continuation of the conglomerate copper formation that extends from the Ontonagon and Houghton regions west along the south shores of Lake Superior, and down into the St. Croix River valley, almost to the Minnesota State line in the vicinity of Burnett County. Prof. C. R. Van Hise, well known from his connection with State and National surveys, and U. S. Grant, of the Minnesota survey, have looked over the ground and have begun work in a preliminary way. They will start in earnest shortly. In the past few months very great interest has been taken in the copper rocks of Douglas, Burnett and Bayfield counties, Wisconsin, and several companies have been organized and are now busily prospecting and exploring. There are certainly some remarkable showings, and it is no wonder that those interested are enthusiastic to the last degree. Some of the copper taken from the Percival, Boston and Superior and Fond du Lac properties is really very encouraging, as your correspondent can vouch. It looks as if something really worth while was to be discovered there, and that a very considerable industry might grow up. It has long been known that the formation in this region was identical with that of the copper region of Ontonagon and Houghton counties, where are the now great mines of the lake region. On the north side of Lake Superior, not far from Duluth, the amygdaloid rocks come to the surface and explorations are in progress for copper. Those interested state that they are thoroughly satisfied with present developments, but the general public knows little about what is going on. If copper stays at a price above 15 cents these developments will probably continue till the question of the deposits is reasonably settled.

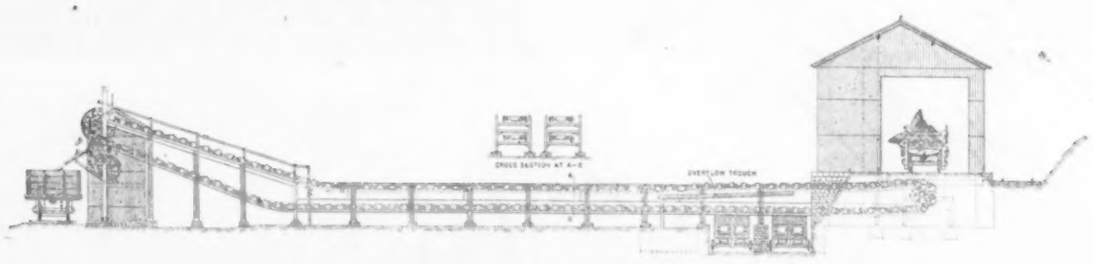


Fig. 1.—General Arrangement.

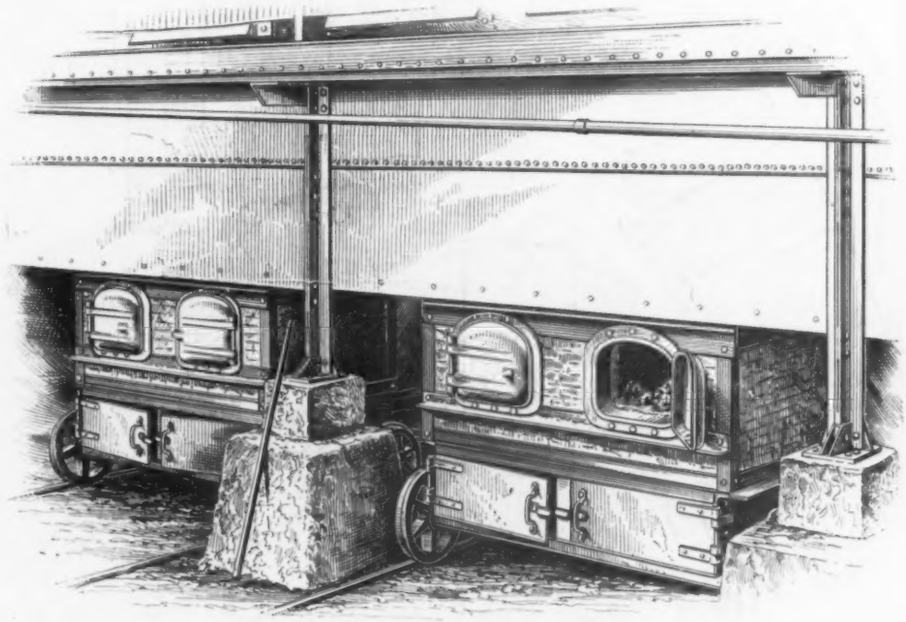


Fig. 4.—The Mold Drying Furnaces.

THE HEYL & PATTERSON PIG IRON CASTING MACHINE.

J. W. Gephart of Bellefonte, Pa., represents the purchasers of the Collins blast furnace, at Bellefonte, Pa. It is hoped to blow it in by July 1.

Rolling Mill Fly Wheels.*

BY JOHN FRITZ, BETHLEHEM, PA.

In the early days of rolling mills the machinery was of the crudest character. The men who built and looked after it were called millwrights or forge carpenters; consequently, wood was used in its construction to as great an extent as was possible. All of the earlier fly wheels, as you will see by the tracing, had wooden arms; at least so far, as I know, and Fig. 4 shows the general way of fitting them in. They were made of hardwood, locust or white oak preferred, and about 6 to 8 inches in thickness, width as per tracing.

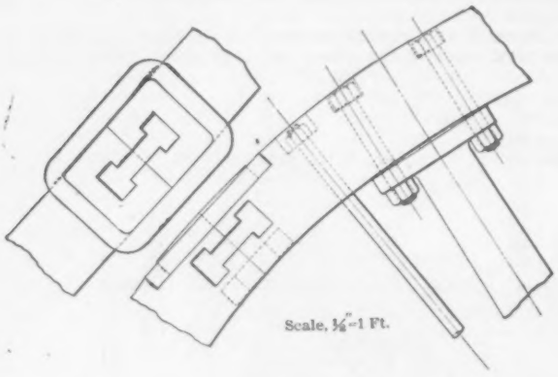


Fig. 3.

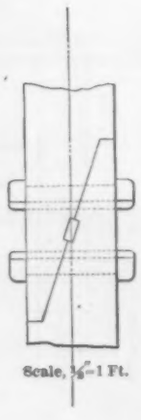


Fig. 2.

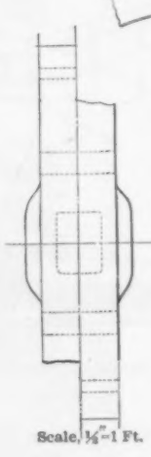


Fig. 1.

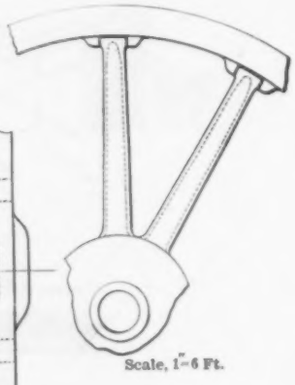


Fig. 5.

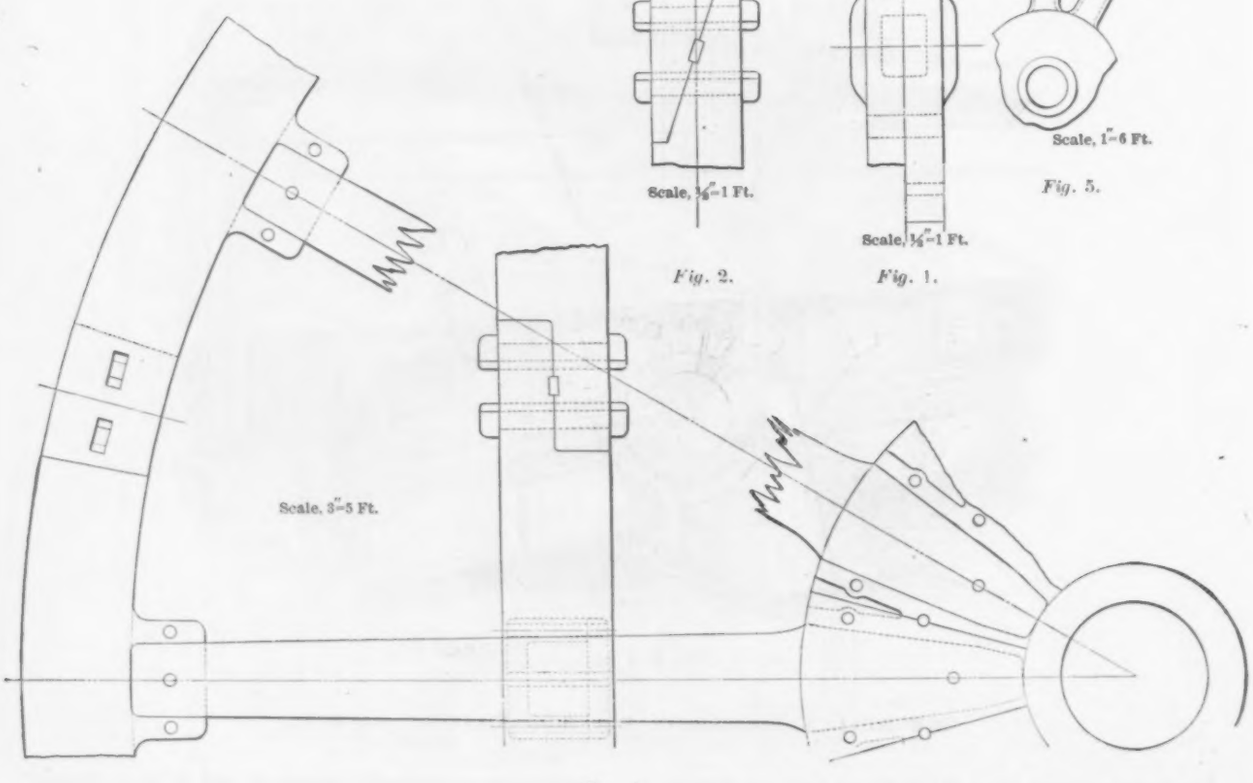


Fig. 4.

ROLLING MILL FLY WHEELS.

Figs. 1, 2 and 4 give the plan of securing the rims of the wheels together. The segments are in halves and secured together with gibs and keys, same as shown in Fig. 4. Having no machine tools when these wheels were built they were put together practically as the castings came from the foundry, with the lumps and swells chipped off with a two handed chisel and sledge, which naturally caused a weak wheel. They were made of cold blast charcoal iron, which was greatly in their favor, and no doubt this fact prevented many accidents.

In the course of time the millwright and carpenter were displaced by the machinist, and with the introduction of machine tools, especially the planer, the wheels were better fitted up, but not much safer, in consequence of the use of iron made from mineral coal in place of charcoal.

The machinist now became the mechanical engineer, and wood not being his forte he made the fly wheel all of cast iron, as shown in Fig. 3. The center, arms and segments were cast separately, and had the ends of the segments been well fitted together the wheel would have given no trouble. The slots for the tees were unfortunately too close to the end of the segment; the result was that they pulled the end of the casting off, and we had to chip grooves across the face of the wheel and put heavy links around them, as shown on tracing, Fig. 2, which made a good wheel out of it. This was done in 1854, and I think the wheel is yet in use, but never ran at high speed.

Not considering these wheels safe I was in constant fear of their going to pieces, which is generally attended with the most disastrous results. I abandoned entirely the old mode of making wheels, and adopted plan No. 5, casting the center and arms together and the rim in one piece, with lugs on the inside of the rim, as shown on tracing, Fig. 5. On the ends of the arms were pads to correspond with the lugs on rim. When the arms were put in the rim there was a space of about ¼ inch, in which oakum was driven tightly, which kept the arms in place. This made an excellent wheel, and in some cases wood was used to fill the space in which thin steel keys were driven. There are several of these wheels that have been in use over 35 years, and so far as I know never have given any trouble. The wheels were 20 feet in diameter, with rims about 12 inches square.

With the introduction of steel for rails and structural material it became necessary to increase the diameter of rolls. This change necessitated heavier wheels and larger in diameter, which made it impracticable to use solid rimmed wheels; consequently some plan that was portable had to be adopted. After much thought the plan represented by Fig. 6 was concluded the best and safest, and there are now a number of wheels of this type in use,

* Paper presented at the Washington meeting of the American Society of Mechanical Engineers.

varying in diameter from 20 to 30 feet. I do not know that any one of them has ever given a particle of trouble in any way, and there are a number of wheels, as per Fig. 6, that have been in use for 25 years, some of which have and are daily liable to encounter the most severe strains that it is possible for a fly wheel to be subjected to, and are to-day apparently as safe as the day they were started.

It has been said that fly wheels go to pieces in consequence of the irregular work, and engines driving dynamos for power purposes have been included in this class; but the strain on a fly wheel driving a dynamo cannot be compared with that of a rolling mill. In the former the work occasionally varies from *nil* to full power, while that of an engine driving a rail mill changes from *nil* to practically full power 12 times while rolling a single rail, which requires about one minute.

Let us for a moment think of a fly wheel 26 feet in diameter, 16-inch rim, making from 70 to 80 revolutions per minute, rolling a steel bloom into a rail. When about one-half done, say about 16 feet in length, instead of the piece going straight out through the rolls on the guides, as intended, it sometimes wedges in the groove, and in less than a second of time it has completely encircled the roll and forms what in rolling mill phrase is called a collar, and continues to wind around the roll until some thing must happen, either the breaking of a roll, a spindle or coupling, or the engine must be brought to a standstill in an almost incredibly short space of time. The tortion on the spindles and couplings is so great that it causes the wheel to rebound. To calculate the strain the wheel is sub jected to under these conditions will require some one better posted in mathematics than I am.

Having alluded to the fact that the introduction of steel in various forms required larger rolls, heavier wheels and larger in diameter, which made it impracticable to use a solid rimmed wheel, led to the adoption of plan of wheel Fig. 6; the tracing makes it so plain that it wants but little explanation. The segment is cast hollow and also the arms, which are made at the ends to compare in thickness to the segment, so as to relieve them of strains which might occur if the segments were cast solid. The holes in the segments are small at the ends, so as to make up for the metal taken out for the tees. The links or tees are different lengths, so that the strain on the segments will not come all at one place, and by using oil tempered steel in the links or double tees the rim will be practically as strong at the joints as it is elsewhere.

In fitting up the wheel the center is bored out and the ends of the hub faced off. It then is taken to the planer, and a center guide plate for the hub is made and bolted to the planer table. Then a boring bar is arranged to bore out the hole and face it off to a given distance from the center for the shoulder of the arm to rest on. There are small chipping pieces on both inner sides of the receptacle for the arm. They are planed off at the same setting to the proper and uniform width and true to the center. This finishes the center.

Next the arm goes on the planer and is set true to the average center, and with a socket on the end of the boring bar with inside cutters the end of the arm is turned off, and the shoulder is faced off to the proper length for the arm to rest on; so at this setting the chipping piece on the upper side of arm, as it lies on the planer, corresponding with the same in the center, is planed off and the average center of the segment is also carefully taken and correctly worked.

After the arms are thus far finished they are placed on the planer again, the other side up, and a socket is made to fit over the end of the arm, which goes into the socket and against the shoulder. On the opposite end of the socket is a hole bored, say 1½ or 2 inches in diameter. The length of arm must be, from the center of the hole to the bottom of socket which arm rests on, the same as the distance from the face upon which the arm rests to the center of the hole in shaft.

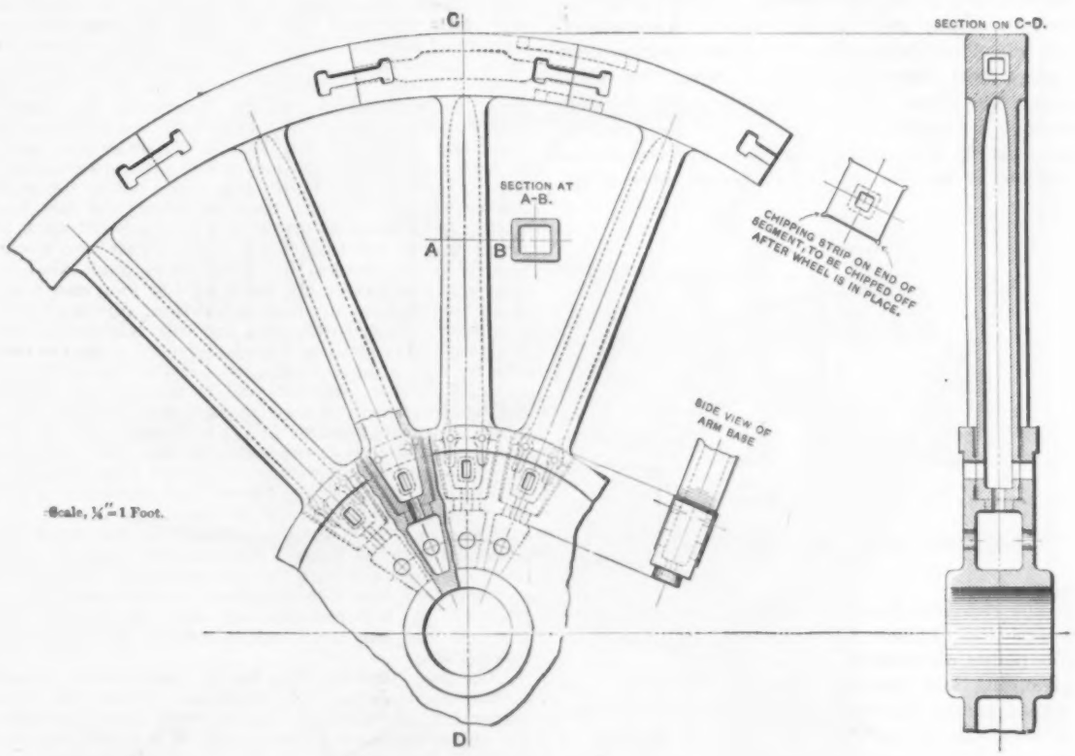


Fig. 6.—The Fritz Fly Wheel.

ROLLING MILL FLY WHEELS.

Next secure a pin on the planer bed to correspond in size with the hole in the end of socket piece. Then put the socket on the end of the arm and on the pin; then bolt the arm down true on the side that is planed and finish to the proper size. When this is done find the exact length of the segment and set it in line with the center and you have the exact angle, and when all is done correctly the wheel will fit together without a chisel or a file being used on it, and will run true without turning, minus the irregularities in the castings.

You will notice there are no abrupt changes in the thickness of the castings, thus avoiding as much as possible the liability of strains. The joints in the segments are generally the weak part of the wheel. In this respect a wheel made from this drawing will be stronger than the original, as the tees in the segments in the wheel now in use were made of wrought iron and will probably not stand over 50,000 pounds tensile per square inch, while in this wheel, if I was to build another, I would use steel that would stand at least 85,000 pounds tensile. This would make the joints practically as strong as the segments.

It will be noticed on tracing there is a space in the center of about ¼ inch in front and rear side of each arm. This is filled with oakum and driven hard, after the wheel

is finished and in place, to keep the arm from yielding in the direction of the strain, and at the same time greatly lessens the work of fitting up the wheel. The 1¾-inch round holes shown on tracing through the center and arm are reamed out, and steel pins made and turned so that they will drive in snugly.

The bolt shown in segment in Fig. 3 does not belong to this wheel, but was simply put in there to show the plan that in many cases was adopted to make the wheels more secure, and is used to some extent at this time.

Discussion.

Professor Kerr said that the rim of the perfect wheel should be free to expand as a whole independently of the spokes. This end was accomplished by Mr. Fritz in the wheel shown in Fig. 5, in which grooves are formed in the rim in which the ends of the spokes enter. In this case the rim is free to expand as a whole and the strains put upon it, due to centrifugal action, are alike and evenly distributed. There are two extremes in the design of a fly wheel—the disk and the free rim. The former introduces undue weight. The latter eliminates those strains which are present in a rigid construction where the spider and rim are united. An examination of fly wheel accidents shows that the breaks occur where the greatest stress naturally falls when the wheel is rotating. The spoke *c* and rim segment, Fig. 7, are in one piece and the tendency is to throw out the center of the segment at *a*. This tends to rupture at *b* and also at *a* the outside of the rim at a point midway betwe n the

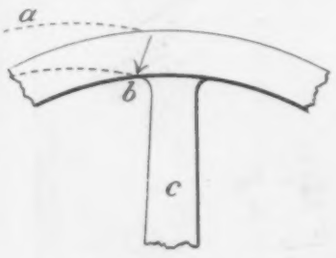


Fig. 7.—Strain on Rim.

ROLLING MILL FLY WHEELS.

spokes. The rim free from the spokes does away with these strains and obviates the danger of the rim giving way at the points mentioned.

Mr. Henning said that the design of Mr. Fritz did away with material where it was not needed and also where it is of the poorest quality, at *b*. It permits of increasing the material where strength is needed. Further the shrinkage stresses are so governed and disposed that they do not interfere with each other.

After Mr. Fritz had explained that one of these wheels had never broken even under the hard service of the rolling mill, a member said "that those fellows who have built wheels that have broken should go and do likewise." It was the general opinion of the members that the wheel described filled all the conditions in the most satisfactory manner.

The Continental Coke Company.

Last week a transaction was concluded by which the Continental Coke Company, an interest of the National Steel Company, purchased 717 acres of choice coal lands in the Connellsville region. The tract is known as the J. V. Thompson tract and adjoins the 1312 acres which the Continental Coke Company bought some time ago from H. C. Frick personally. The whole tract is in Georges and South Union townships, right in the heart of the Connellsville region, and the coal is a fine quality, the price paid for the 717 acres being $1100 an acre, or $788,700 for the whole tract. Connection with the Southwest Railroad can be made from the Coal Lick Run branch, on which the tract is located. Plans will be drawn immediately for the building of 600 coke ovens of the standard beehive type of the Connellsville region, and mines will be opened and shafts sunk.

The trustees of Columbia University have approved the agreement with a committee representing the New York Chamber of Commerce, whereby the interest on a sum of $100,000, raised by public subscription, will be paid to the widow and daughter of the late Col. George E. Waring, Jr., for life, and will then be used to found the Waring Municipal Fund, which will be spent in sustaining a chair of instruction in municipal affairs at the Columbia University. An offer of the New York Chamber of Commerce to defray the expenses of a course on Commerce at the university was also accepted. This course, which will require $15,000 a year, is to be under the exclusive control of the university trustees.

The Amalgamated Association.

The twenty fourth annual convention of the Amalgamated Association of Iron, Steel and Tin Workers will be held in Detroit, Mich., this week, commencing Tuesday, May 16. It is expected for several reasons that this will be one of the largest and most important conventions of this labor organization ever held. It is certain that the scale of wages for puddling and bar mills and sheet and tin plate mills will be on a higher rate than the scale which expires on June 30. Instead of treating with the mills individually as heretofore, the scales for the puddling and bar mills this year will be taken up with the recently organized Republic Iron & Steel Company, which concern have taken over most of the leading bar mills in the Central West. The scale for the tin plate mills will be taken up with officials of the American Tin Plate Company, and it is understood that both the Republic Iron & Steel and American Tin Plate Companies have arranged to send representatives to Detroit during the convention for the purpose of settling the scales before the meetings are concluded. It has been customary for the Amalgamated Association in previous years to insist upon a shut down in the summer of anywhere from two weeks to a month or six weeks, the claim being made that the hot weather was extremely hard on the men and that they were in absolute need of a vacation. Owing to the tremendous activity in the iron and steel trades it is believed that some arrangement will be effected with the association by which the annual shut down of the mills will be avoided for this year. It will be pointed out to the men that such a season of activity as now exists may not come again for several years, and it will be to the interests of the men as well as to the mills to take full advantage of it. It is practically certain that the new boiling scale will be on a $5 basis on a 1 cent card, instead of a $4 basis as at present, an advance of $1 a ton.

The wage scale already adopted for the sheet and tin plate mills by the Wage Committees is based on a considerably higher rate than the present scale. Notwithstanding the fact that the advances in wages asked are quite heavy it is believed that an early settlement will be reached and the mills will continue in uninterrupted operation.

The past year has been one of considerable prosperity to the Amalgamated Association. Under the vigorous leadership of President Shaffer very large accessions to the membership have been made. It is stated that in some districts the membership has been increased as much as 75 per cent. and down to 25 per cent. in other places. It is expected that the present officials will be re-elected. These consist of Theo. J. Shaffer, president; John Williams, secretary and treasurer, and Stephen Madden, assistant secretary. It is also probable that President Shaffer will ask for the appointment of an assistant as general organizer, since the work has become so heavy of late.

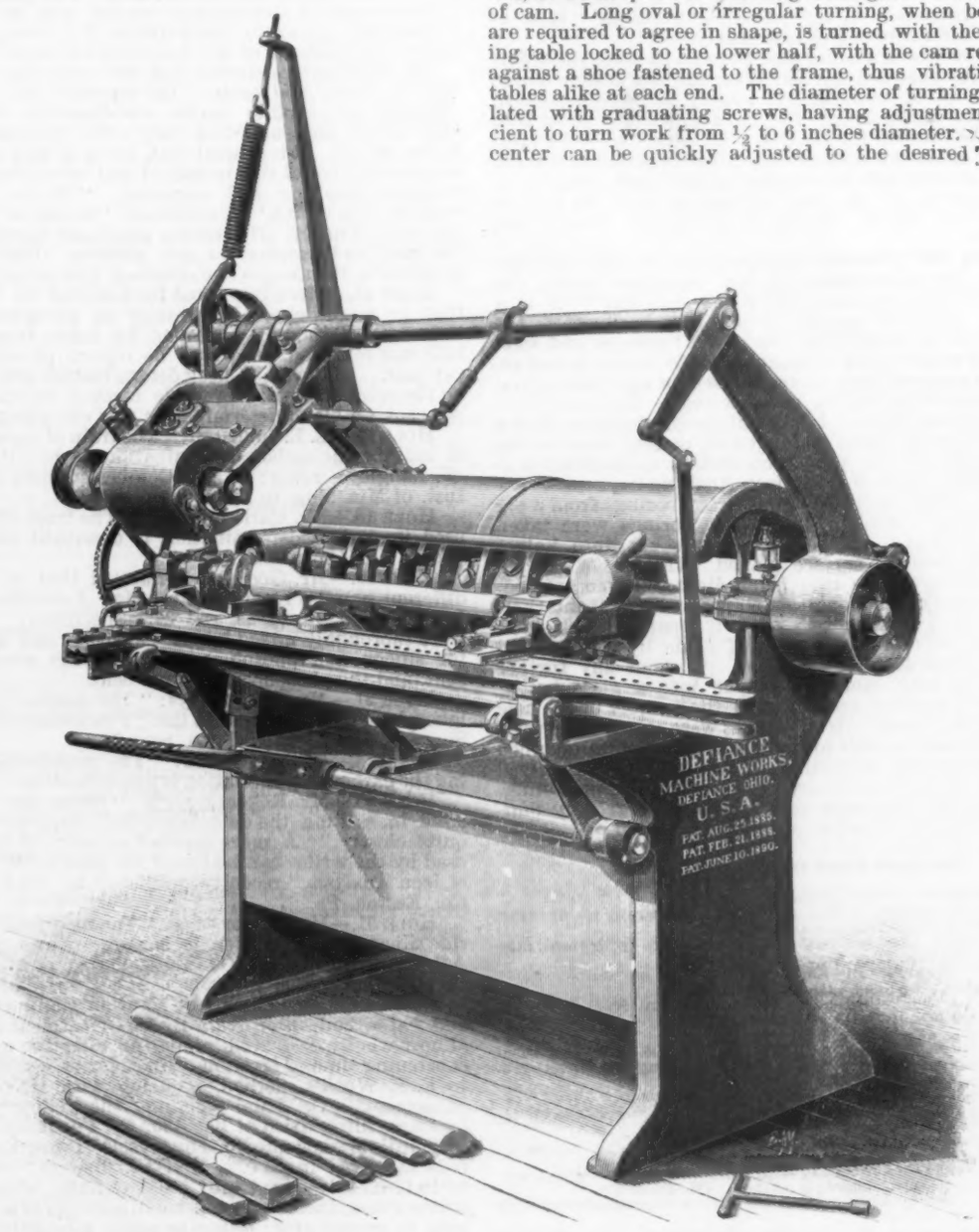
The Miami Cycle Company of Middletown, Ohio, have been awarded a contract for a large quantity of 5-inch shrapnel shells, of an improved form of their own design, which is especially commended by the United States Government authorities at Washington, D. C. The Peters Cartridge Company of Cincinnati, Ohio, received an order for several carloads of bullets to apply on the same contract, which are now being produced with the utmost rapidity.

P. Pasquier of the St. Fiacre Works, Monceau-sur-Sambre, France, publishes in the *Revue Universelle des Mines* the first instalment of a series of articles on the manufacture of tin plate. A feature is the close attention paid to American appliances, there being illustrations of the Booth Garrison, Lewis, Leechburg, Frank-Kneeland, Totten and other hot mills.

The American Wrecking & Salvage Company of Detroit, Mich., are about to resume the work of removing the copper from the wreck of the steamship "Pewabic," in Thunder Bay, Lake Huron. There is about 200 tons of copper yet aboard the boat. The price of copper has nearly doubled since the work began two years ago.

The Defiance Automatic Combined Spoke and Handle Lathe.

The Defiance Machine Works of Defiance, Ohio, build the lathe illustrated for turning and squaring spokes for wagon and carriage wheels, having the necessary adjustments for making common, Sarven patent or sharp edged shapes. It will turn either light hickory spokes or heavy spokes for truck and artillery wheels up to 5 inches diameter by 42 inches long. It is furnished with extra cutter heads and cams for turning round and oval single-



THE DEFIANCE AUTOMATIC COMBINED SPOKE AND HANDLE LATHE.

holes through the table, upon which it vibrates for oval turning. At the opposite end on the head center spindle a cast iron cam is placed of whatever shape desired to turn; the cam rides against an upright shoe extending up from the lower table, and is held snug against the shoe by a coiled spring. When the table is moved toward the cylinder to where the turning shall begin an automatic feed slowly rotates the object to be turned, and the cam revolving against the shoe oscillates the upper table in a path corresponding with the shape of the cam. When the pivot is placed directly opposite the tail center the machine will turn the material round at the tail center end with a gradual change in shape toward the opposite end, at which point the turning will agree with the shape of cam. Long oval or irregular turning, when both ends are required to agree in shape, is turned with the vibrating table locked to the lower half, with the cam revolving against a shoe fastened to the frame, thus vibrating both tables alike at each end. The diameter of turning is regulated with graduating screws, having adjustments sufficient to turn work from ½ to 6 inches diameter. The tail center can be quickly adjusted to the desired distance from the spur center for short or long turning or at right angles for straight or taper turning.

The swinging cutter head advances or retreats from the work automatically; its position is governed by the movement of the table; it is brought down to its work at the same time the turning commences, and when the table is moved backward to remove the turned material from the centers it is lifted out of the way by a spring balance; its action upon the turning is governed by a cam upon the live center spindle and it will follow the path of either a square cam for squaring the head of spokes or oval, oblong, hexagon or octagon shapes suited to finishing the eye end of handles, having the necessary adjustments to turn tapering in either direction, as well as the different diameters.

The blanks are placed in the machine and removed without stopping.

trees, hammer, hatchet maul, railroad and mining pick handles and double bitted axe helves.

The body of the machine supporting the working parts is a heavy one-piece casting having cored center and broad base. The cylinder is composed of a sufficient number of cutter heads placed side by side upon a 2¼-inch steel spindle to fill the length of turning. Each head is provided with three cutters, with 3 inch face, which lap over each other, forming a continuous cutting edge over the entire length of cylinder, to turn the full length at one cut. The heads are secured to the spindle by friction binder.

The table is constructed in two parts, and it is gibbed and slides upon the frame in angleways moved to and from the cutters by either hand or foot lever; the upper portion supporting the centers is pivoted to the lower half near the tail center by a steel pivot, in one of the several

Pig Iron Analysis.

A Comparative Statement of Results Obtained by Different Chemists from the Same Piece of Pig Iron.

BY EDMUND E. JOHNSTON, CHEMIST, ASHLAND IRON & STEEL COMPANY, ASHLAND, WIS.

I read with a great deal of interest Thomas D. West's article in the *Iron Trade Review* of April 14, 1898, entitled "Need of Greater Uniformity in Pig Iron Analysis," also the discussion in the preceding numbers, "How to Secure Uniformity in Pig Iron Analysis."

It is the writer's belief that the variations in the different results obtained by Mr. West are not wholly due to the methods of analysis, but largely to discrepancies in the samples themselves. The most important point is in taking the samples for analysis. If more care were exercised the chemist would not obtain such discordant results.

It is a very difficult matter to mix and subdivide a large quantity of pig iron borings so that the various samples will check. Irregularities in the sample are inevitable.

Having had practical experience along this line, and realizing the importance of the questions raised, the writer issued a circular letter and sent out with it a carefully prepared sample of pig iron borings to the chemists of a number of the blast furnaces and steel works. I asked that a complete analysis be made and reported to me, with the methods used in each determination. Some fifty replies were received. They are interesting and suggestive. I have tabulated them, as shown on the following pages, and herewith present them for the consideration of the profession and as a contribution to the general subject of "Pig Iron Analysis."

These results were obtained from borings from a pig of our No. 1 "Hinkle" iron. The borings were taken with a ½" twist drill. The pig was cut into halves lengthwise and its surface planed. The face of the pig showed no flaws, the iron being close and even grained. Borings were taken along this planed surface at intervals of every ½", making two rows 1" apart. Each sample, therefore, represents a hole ⅛" wide by 2" deep, and it weighs from 45 to 50 grammes. Without any further preparation each sample was put into a glass bottle, sealed, and marked according to the number of the hole from which it came. Fifty samples were taken altogether. It may perhaps be well to state that the results obtained by the chemists contributing to this paper were arrived at independently. It is therefore valuable and interesting, as showing that the method of *grading pig iron by analysis* is a reliable one when properly conducted.

Methods Used in Opposite Table.

A —Dr. Drown's. A*—Dr. Drown's modified.
A1—Si and P solution in HCl and HNO3, evaporate to dryness; taken up in HCl; ignite and weigh silica.
A2—S. A. Ford's. A3—Solution in HCl, evaporate to dryness, take up with HCl, filter, ignite and weigh.
B —James O. Handy's. B1—Emmerton's.
B*—Emmerton's modified. B2—Magnesia method.
B3—Weighing the yellow ppc. B4—International Steel Standard Com. method. B5—E. F. Wood's.
C —Volhard's. C*—Volhard's modified.
C1—Precipitating Mn in con. HNO3 with KClO3, making a basic acetate separation of the iron and weighing the Mn as pyrophosphate. C2—William's.
C3—Ford and William's. C4—Julian's.
C5—Colormetric method. C6—Gravimetric method (Blair's Chem. Anal. Iron, 3rd Ed.).
C7—Basic acetate, weighing as Mn_3O_4.
C8—S. A. Ford's.
D —Evolution method, titrating with iodine solution.
D1—Bramble's. D2—Aqua-regia method. D3—Dudley's.
D4—Gravimetric, by solution in strong nitric acid precipitation with barium chloride.
E —Combined carbon by subtracting the graphitic from the total carbon.
E1—By color, using standards of known per cent.
F —Solution in nitric acid, combustion in chromic and sulphuric acid.
F1—Solution in nitric acid, combustion in oxygen, using a platinum tube.
F2—Solution in hydrochloric acid, combustion in chromic and sulphuric acid.
F3—Solution in hydrochloric acid, combustion in oxygen, using a platinum tube.
F4—Solution in hydrochloric acid, combustion in oxygen and collecting gas in barium hydrate; ignite and weigh.
F5—Solution in nitric acid, weighing graphite on weighed filter.
F6—Koesten's.
F7—Solution in nitric acid, combustion in oxygen, collecting gas in barium hydrate; ignite and weigh.
G —Solution in double chloride of potassium and copper, combustion in chromic and sulphuric acid.
G1—Solution as in G, combustion in oxygen, using platinum tube.
G2—Solution as in G, combustion in oxygen, collecting gas in barium hydrate solution; ignite and weigh.
G3—The sum of combined and graphitic carbons.
G4—Regnalt's.

Abstracts from Chemists' Reports.

The averages given in columns marked "Details," 1, 3, 5, 7, 9, 11, and 13, namely: 1.261 silicon; .1762 phosphorus, &c., are considered to be the correct results, because in making these, each separate determination is considered and therefore has equal weight. If the average be taken of the mean results of each chemist's work, as shown in columns number "Average" 2, 4, 6, 8, 10, 12, and 14 respectively, these might represent the general average of the various laboratories. In order to make the record as complete as possible the following extracts from the reports rendered are given in explanation of the results obtained.

HOLE 8.—Bertrand S. Somers says: "Silicon was determined by Drown's method as described in the third edition of Blair's, with the exception that the silicon is not volatilized. For manganese the method identical with Williams' was used, except we use acidulated hydrogen peroxide instead of ferrous sulphate. The platinum tube furnace used in determining carbon will be found described in a paper by the writer in Vol. XVIII, page 1087, of the 'Proceedings of the American Chemical Society.'"

Mr. Summers requested that we send him more drillings to check his results. He reported that the results obtained on graphite varied considerably, running as high as 3.83 per cent. when only a few drillings were left in the sample. It is evident that, being so rich in graphite, a concentration of this metalloid had taken place through frequent handling and sampling. "When the sample was not well mixed," he continues, "we got as low as 3.41 per cent. Finally, after taking great care to mix the sample and endeavoring to get uniform distribution of graphite in the sample, we obtained concordant results."

HOLE 11.—Mr. Blair asked for a second lot of drillings that he might check his results on phosphorus by the "Acetate Method." A second lot taken from the same hole was sent him, on which he reports phosphorus .167 per cent. He says: "Check determination was also made on the sulphur by the Bramble method, which gave .031 per cent.; a blank determination was run along with it."

HOLE 17.—E. E. Johnston: "The train of apparatus used in making the carbon determinations is described in Jno. W. Langley's report at the October meeting of the Am. Inst. of Min. Eng. in Pittsburgh, 1890."

HOLE 18.—Mr. Carlsson says: "The train of apparatus used in carbon determination is described at length in 'Jour. Am. Chem. So.' 1893."

HOLE 19.—Mr. Goodrich requested that we send him different samples from the same pig. I sent him samples from Holes 7, 13, 24, 28, and 39 respectively. These five were thoroughly mixed by Mr. Goodrich and determined for silicon and phosphorus. The silicon went 1.31 per cent. and the phosphorus .169 per cent.

HOLE 21.—Mr. Clifton says: "The method used in our laboratory can be found in the "Proceedings of the Eng. So. of Western Pa. (Vol. XII, page 76)."

HOLE 23.—E. E. Johnston: "The method used in making the carbon determination is a modification of Ullgren."

HOLE 25.—Mr. Rogers reports: "Great care was exercised in making the determinations, duplicates agreeing quite closely." A more detailed account of the method used by the writer can be found on page 45, in "Methods of Iron Analysis," recently published by the Chem. Pub. Co., Easton, Pa.

HOLE 31.—Mr. Textor says: "The modification used in the silicon determination is one of my own, as follows: After evaporating to SO_3 fumes, 15 c. c. of a solution of CrO_3 (15 gr. CrO_3 to 100 c. c. H_2O) are added to contents of evaporating dish, and solution again evaporated: add water, boil, filter, &c. By this treatment graphite is almost wholly destroyed, rendering filtrating quicker and shortening time of ignition. Phosphorus was determined by E. F. Wood's method, oxidizing with HNO_3 solution of metal with CrO_3 and weighing the yellow precipitate on single filter, dried at 100°-130° C. For manganese used Volhard's method, modified by myself. Two grammes drillings dissolved in 35 c. c. HNO_3 1.20 sp. gr. concentrated to 10 c. c., introduced into 500 c. c. flask, with 300 c. c. water added, then ZnO milk, small portions at a time, until iron is precipitated; dilute to mark, take 300 c. c., filter, boil, titrate with $K_2Mn_2O_8$ solution. Sulphur, residue in flask is oxidized with Br in HCl; .003 per cent. was obtained in the residue."

HOLE 38.—Mr. Wyckobb says: "I checked the sulphur by the iodine method, obtaining the same as in my former determination, .012 per cent."

HOLE 40.—A. E. Outerbridge, Jr., says: "Owing to rush of work was able to make but one determination."

HOLE 43.—Mr. McPherran: "Results on manganese were checked by Volhard's method."

By examining the preceding tables it will be noticed that nearly all the chemists use the same method on silicon, and many use the same method for phosphorus, manganese, and sulphur.

38 use Method A for silicon.
2 use Method A3 for silicon.
1 uses Method A1 for silicon.
1 uses Method A2 for silicon.
1 uses Method A* for silicon.
17 use Method B1 for phosphorus.
12 use Method B for phosphorus.
7 use Method B3 for phosphorus.
3 use Method B2 for phosphorus.
2 use Method B4 for phosphorus.
1 uses Method B5 for phosphorus.
1 uses Method B1* for phosphorus.
29 use Method D for sulphur.
5 use Method D1 for sulphur.
3 use Method D2 for sulphur.
1 uses Method D3 for sulphur.
1 uses Method D4 for sulphur.

As for manganese, the methods are about equally distributed.

	Hole No.	Method	SILICON Details 1	SILICON Average 2	Method	PHOSPHORUS Details 3	PHOSPHORUS Average 4	Method	MANGANESE Details 5	MANGANESE Average 6	Method	SULPHUR Details 7	SULPHUR Average 8	Method	C. CARBON Details 9	C. CARBON Average 10	Method	G. CARBON Details 11	G. CARBON Average 12	Method	T. CARBON Details 13	T. CARBON Average 14
Wm. Wilkins, Cleveland; Cliffs I. Co., Gladstone, Mich.	1	A	1.285 1.28	1.2825	B1	.173 .175	.174	C	.33 .34	.355	D	.010	.010	E	.430	430	F	3.59	3.59	G	4.02	4.02
Jno. P. Griffiths, Antrim I. Co. Macelona, Mich.	2	A	1.28	1.28	B1	.176	.176	C3	.335	.355	D	.012	.012									
Jno. K. Mackenzie, Dickman & M. Chicago, Ill.	3	A	1.21	1.21	B1	.181	.181	C	.370	.370	D	.009	.009	E1	.380	.380	F1	3.850	3.850	G1	4.230	4.230
Cremer & Bicknell, Cleveland, O.	4	A	1.22	1.22	B2	.178	.178	C*	.38	.38	D2	.012	.012									
E. E. Johnston, Ashland I. & S. Co. Ashland, Wis.	6	A	1.24 1.26	1.25	B	.175 .175	.175	C	.37 .39	.38	D	.010 .012	.011									
Bertrand S. Summers, West. Electric Co. Chicago, Ill.	8	A	1.19 1.21	1.20	B1	.179	.179	C4	.36	.36	D	.013	.013	E	.557	.557	F1	3.59 3.57 3.62	3.593	G1	4.15	4.15
Jno. L. Harvey, Homestead Works, Munhall, Pa.	10	A	1.27	1.27	B3	.176 .178	.177	C5	.33 .34	.335	D	.014 .016	.015	E	.91	.91	F1	3.050	3.050	G1	3.960	3.960
Andrew A. Blair, Booth, Garret & B. Philadelphia, Pa.	11	A	1.320	1.320	B4	.162 .167	.1645	C6	.276	.276	D1	.025 .031	.028	E	.3620	3620	F1	3.580	3.580	G1	3.942	3.942
Prof. E. D. Campbell, Ann Arbor, Mich.	14	A	1.30	1.30	B3	.180	.180															
F. A. Emmerton, Cleveland, O.	15	A	1.27	1.27	B2	.178	.178	C	.44	.44	D3	.003	.003	E	.62	.62	F4	3.80	3.80	G2	4.42	4.42
J. M. Camp, Duquesne Steel Works, Cochran, Pa.	16	A	1.28	1.28	B3	.175 .176	.1755	C5	.342	.342	D2	.009	.009							G1	4.220	4.220
W. E. Dickson, Spearman Iron Co. Sharpville, Pa.	17	A	1.24	1.24	B*	.175	.175	C*	.36	.36	D	.010	.010	E1	.45	45	F5	3.54	3.54	G3	3.99	3.99
E. E. Johnston	17	A	1.29 1.31	1.30	B	.178 .178	.178	C	.34 .36	.35	D	.011 .011	.011	E	.437	.437	F	3.741	3.741	G	4.178	4.178
Hugo Carlson, Johnson Steel Co. Lorain, O.	18	A	1.31	1.31	B	.174	.174	C2	.30	.30	D1	.010	.010	E	.52	.52	F1	3.73	3.73	G1	4.25	4.25
H. M. Goodrich, J. A. & P. E. Dutcher Co. Milwaukee, Wis.	19	A	1.29	1.29	B4	.170	.170	C3	.30	.30	D	.011	011									
Benedict Crowell, Cleveland, O.	20	A	1.25	1.25	B2	.180	.180	C	.34	.34	D2	.009	.009									
Warren R. Clifton, Shenango V. S. Co. New Castle, Pa.	21	A	1.295	1.296	B	.173	.173	C5	.355	.355	D	.011	.011	E	.381	.361	F6	3.775	3.775	G4	4.156	4.156
Frank E. Hall, Union Rolling M. Co., Cleveland, O.	22	A	1.31	1.31	B	.172	.172	C	.39	.39	D	.009	.009	E1	.52	.52	F5	3.63	3.63	G3	4.150	4.150
E. E. Johnston	23	A	1.30	1.30	B1	.172	.172	C1	.35	.35	D1	.011	.011	E	.51	.51	F2	3.65	3.65	G	4.160	4.160
S. M. Rodgers, Oliver Snider S. Co., Pittsburgh, Pa.	25	A	1.297	1.297	B3	.178	.178	C1	.365	.365	D	.012	.012	E1	.48	.48	F5	3.671	3.671	G3	4.151	4.151
E. E. Johnston	26	A	1.26	1.26	B3	.178	.178	C1	.34	.34	D1	.011	011	E	45	.45	F2	3.710	3.710	G	4.160	4.160
Theo. Tonnele, W. Dewees Wood Co. McKeesport, Pa.	27	A	1.25	1.25	B	.178	.178	C5	.31	.31	D	.010	.010	E1	.35	.35	F5	3.77	3.77	G3	4.120	4.120
Dr. M. E. Rothberg, Cambria Iron Co. Johnstown, Pa.	29	A	1.30	1.30	B	.187	.187	C	.32	.32	D	.009	.009	E	.568	.568	F1	3.642	3.642	G1	4.210	4.210
W. B. Viets, Carbon Iron & S. Co., Parryville, Pa.	29	A	1.29	1.29	B1	.190	.190	C7	.35	.35	D	.012	.012				F5	3.80	3.80			
Oscar Textor, Cleveland, Ohio.	31	A*	1.30	1.30	B5	.176	.176	C*	.33	.33	D	.006	.006	E1	.40	.40	F5	3.87	3.87	G3	4.370	4.370
Geo. P. Vanler, Steelton, Pa.	32	A1	1.33	1.33	B	.172	.172	C2	.29	.29	D	.009	.009	E	.289	.289	F1	3.825	3.825	G1	4.114	4.114
Fred H. Williams, Riverside I. Works, Wheeling, W. Va.	33	A	1.30	1.30	B	.180	.180	C2	.26 .25	.255	D	.010	.010									
C. C. W. MacPherran, Northwestern M. I. Co., Milwaukee, Wis.	34	A	1.32	1.32	B1	.175	.175	C4	.37 .38	.375	D	.014	.014									
W. L. Watt, Kittanning I. & S. M'f'g Co. Kittanning, Pa.	35	A2	1.360	1.360	B3	.183	.183	C*	.38	.38	D	.014	.014	E	.401	.401	F1	3.812	3.812	G1	4.213	4.213
F. E. Thompson, The Emberville I. Co., Emberville, Tenn.	36	A	1.30	1.30	B1	.175	.175	C8	.30	.30	D	.011	.011	E	.47	.47	F5	3.70	3.70	G	4.17	4.17
S. B. Marshall, Dunbar Fce. Co., Dunbar, Pa.	37	A3	1.25	1.25	B1	.193	.193	C7	.439	.439												
Walter Wyckoff, The Thomas I. Co., Hokendauqua, Pa.	38	A	1.32	1.32	B1	.182	.182	C3	.28	.28	D	.012	.012									
A. E. Outerbridge, Jr., Philadelphia, Pa.	40	A	1.38	1.38																		
Robt. M. Miller, Lucy Fce. Carnegie S. Co., Pittsburg, Pa.	41	A	1.28	1.28	B1	.177	.177	C	.36	.36	D	.010	.010	E	.45	.45	F5	3.76	3.76	G	4.210	4.210
Wm. A. Stephan, Warwick Iron Co., Pottstown, Pa.	42	A	1.28	1.28	B1	.170	.170	C	.30	.30	D	.009	.009	E1	.41	.41	F5	3.78	3.78	G3	4.190	4.190
R. S. MacPherran, The E. P. Allis Co., Milwaukee, Wis.	43	A	1.31	1.31	B1	.174	.174	C4	.36	.36	D	.013	.013									
E. E. Johnston	44	A	1.30	1.30	B	.174	.174	C	.33	.33	D	.013	.013	E	.45	.45	F	3.722	3.722	G	4.172	4.172
G. L. Davison, Illinois Steel Co., South Chicago, Ill.	45	A	1.26	1.26	B	.170	.170	C4	.29	.29	D4	.009	.009					3.77	3.77	G1	4.12	4.12
W. P. Putnam, Detriot, Mich.	46	A	1.27	1.27	B1	.185	.185	C	.36	.36	D	.009	.009									
H. A. Knauss, Crane Iron Works, Catasauqua, Pa.	47	A	1.30	1.30	B1	.180	.180	C3	.29	.29	D	.012	.012									
C. B. Murray, Edgar Thomas S. W'ks, Braddock, Pa.	48	A3	1.26	1.26	B3	.171	.171	C	.35	.35	D	.011	.011	E	.52	.52	F7	3.56	3.56	G2	4.18	4.18
J. R. Harris, Tenn. C. I. & R. R. Co., Birmingham, Ala.	49	A	1.26	1.26	B	.183	.183	C	.34	.34	D	.012	.012							G1	4.04	4.04
E. E. Johnston	50	A	1.26	1.26	B1	.178	.178	C1	.34	.34	D1	.013	.013	E	.46	.46	F2	3.687	3.687	G	4.147	4.147
AVERAGE			1.261	1.262		.1762	.1761		.34	.341		.0113	.0111		0.443	0.443		3.678	3.692		4.156	4.156

Importance of a Properly Prepared Sample.

There seems to be a great deal of feeling among the chemists generally in regard to the conclusion Mr. West drew from their report in his article of April, 1898, previously referred to. Some state that they refused altogether to work on his sample on account of the extraneous matter in it, as they could not check their results. Others say the sample was contaminated with much sand and rusted scale, but they made the analysis through courtesy, advising him at the same time that the result could not be relied upon. These extenuating points Mr. West does not give in his article. One can readily see by comparing our results with those obtained by Mr. West that the sample must be carefully taken and prepared if uniform results are to be secured. From the results obtained by Mr. West and many others one can see that his method of checking the accuracy of a chemist's work is open to much criticism. The want of strict homogeneity and uniform combination in the composition of an ordinary pig iron sample may be very clearly shown by sifting the fine portions from the coarse. This was nicely demonstrated in Albert Ladd Colby's report in *The Iron Age*, June 2, 1898.

He got the following results by sizing a sample obtained by rapid drilling into the fracture of an open iron:

Portions remaining on 20-mesh sieve	2.090 per cent. graphite.
Portions between 20-40-mesh sieve	2.100 per cent. graphite.
Portions between 40-80-mesh sieve	1.912 per cent. graphite.
Portions finer than 80-mesh sieve	2.684 per cent. graphite.

J. Parry and J. J. Morgan (*Industries*, Vol. 14, p. 90), in Mr. Colby's report of June 2, quote the following determinations made on drillings not carefully mixed.

	Per cent.	Per cent.	Per cent.	Per cent.
Silicon	2.11	1.74	1.93	1.70
Graphite	3.60	3.50	3.37	3.80

The writer compared a sample of several ounces of drillings of pig metal, as sent out for analysis, and rubbed them up in an iron mortar sufficiently for all to pass through a 30-mesh sieve; the mass was then put into another sieve of 80 mesh and shaken to separate the fine from the coarse; about one-fourth passed through. Equal portions of the fine and coarse were then carefully analyzed, with the following results:

	Coarse.	Fine.
Graphite carbon	1.376	6.862
Total carbon	.230	.350
Silicon	2.780	3.050
Manganese	.710	.760
Phosphorus	.200	.170
Sulphur	.014	.020
Iron	94.590	88.668
Totals	99.900	99.880

P. W. Shimers' method of obtaining duplicate graphite determinations by first moistening the drillings of cast iron with alcohol has given me very good results. Another way which has given the writer very satisfactory results is to take approximately the quantity of drillings desired for analysis, weighing and using all the drillings as they come from the pig, whether more or less than the dead weight. Of course this method can only be applied when you have a sample pig to work with.

Preparation of "Standards."

Our method of preparing a standard sample is to select a small pig and cut it down on a planer to about 6" x 4" x 2". Sample drillings are taken and put into glass bottles. This is analyzed by different chemists and the mean results taken as the per cent. In obtaining the strength of a solution to be used in titrating, I take just enough drillings from the "standard" to accomplish the work. A very good way to check the accuracy of analysis is suggested by Mr. Colby in his report; that is, to send the chemist pieces of the same pig. My reasons for using a pig as a "standard" in preference to a lot of drillings is because from results obtained it is safe to assume that a well selected, close grained pig is more homogeneous than a large sample of pig iron drillings.

While the results shown in this paper are based upon only one sample of pig iron, yet enough information has been obtained to demonstrate clearly the importance of a homogeneous sample. They also show the degree of accuracy that can be obtained by different chemists working on a reliable sample.

Few persons outside of the chemists themselves realize the importance of a homogeneous sample, nor do they understand the difficulty in obtaining such a sample. Personally I am much interested in the adoption of uniform and practical methods among iron and steel chemists, if such methods can be made to meet the needs of the time. But since iron and steel manufacturers are increasing their demands for rapid work, it would seem quite a difficult task to adopt uniform methods in all our laboratories. Many of the so called "short methods" are quite accurate in the hands of the chemist who knows well the material he is working with, while the same method would not give satisfactory results if applied generally. Uniformity is the surest means of securing for our profession the recognition which it justly deserves.

In conclusion, I cannot sufficiently thank my fellow chemists for their kind and generous response to my circular. My acknowledgments are also due to our manager, L. E. Dunham, himself a practical chemist, who has assisted me in many ways, and to the Ashland Iron & Steel Company for printing this report. It is hoped that the showing made herein will be of some value.

The sample pig used in this investigation is still in the possession of the writer, who will gladly send borings to any one interested in checking results with those in the above table.

The Republic Iron & Steel Company.

The formal organization of the Republic Iron & Steel Company has been completed and the transfer of the various constituent companies has been concluded. The following is the Board of Directors:

August Belmont of August Belmont & Co., New York.

Myron C. Wick, formerly president of the Union Iron & Steel Company, Youngstown, Ohio.

Grant B. Schley of Moore & Schley, New York.

Randolph S. Warner of King, Gilbert & Warner, Columbus, Ohio.

George R. Sheldon of W. C. Sheldon & Co., New York.

J. G. Caldwell of the Birmingham Rolling Mills Birmingham, Ala.

G. Watson French of the Sylvan Steel Company, Moline, Ill.

Alexis W. Thompson of the Atlantic Iron & Steel Company, New Castle, Pa.

George D. Wick of the Mahoning Valley Iron Company.

John F. Taylor of Brown, Bonnell & Co., Youngstown, Ohio.

Harry Rubens of Rubens, Dupuy & Fischer, Chicago.

T. A. Meysenburg of the Tudor Iron Works, St. Louis.

L. E. Cochran of the Andrews Bros. Company, Youngstown, Ohio.

James C. Corns of the Corns Iron & Steel Company, Massillon, Ohio.

H. W. Hassinger of the Alabama Rolling Mills Company.

P. L. Kimberly of New Castle, Pa.

George M. Bard of the Indiana Iron Company, Muncie, Ind.

George M. Clarke of the Mitchell, Tranter Company, Cincinnati.

Samuel Thomas of the Pioneer Mining & Mfg. Company, Birmingham, Ala.

S. J. Llewellyn of the Inland Iron & Forge Company, Chicago.

The following officers were elected:

President, Randolph S. Warner.
First Vice-President, George D. Wick.
Second Vice-President, Samuel Thomas.
Third Vice-President, James C. Corns.
Fourth Vice-President, George M. Bard.
Secretary, S. J. Llewellyn.
Treasurer, John F. Taylor.
General Counsel, Harry Rubens.

Executive Committee—Myron C. Wick, Alexis W. Thompson, John F. Taylor, T. A. Meysenburg, G. Watson French, George D. Wick, Harry Rubens, S. J. Llewellyn and Randolph S. Warner.

The Executive Committee has voted to grant an increase in wages of 25 cents a ton in puddling and a corresponding advance for finished labor, all to take effect from May 1.

The headquarters of the new company will be in the Stock Exchange Building at Chicago. The company begin business with a working capital of $6,500,000.

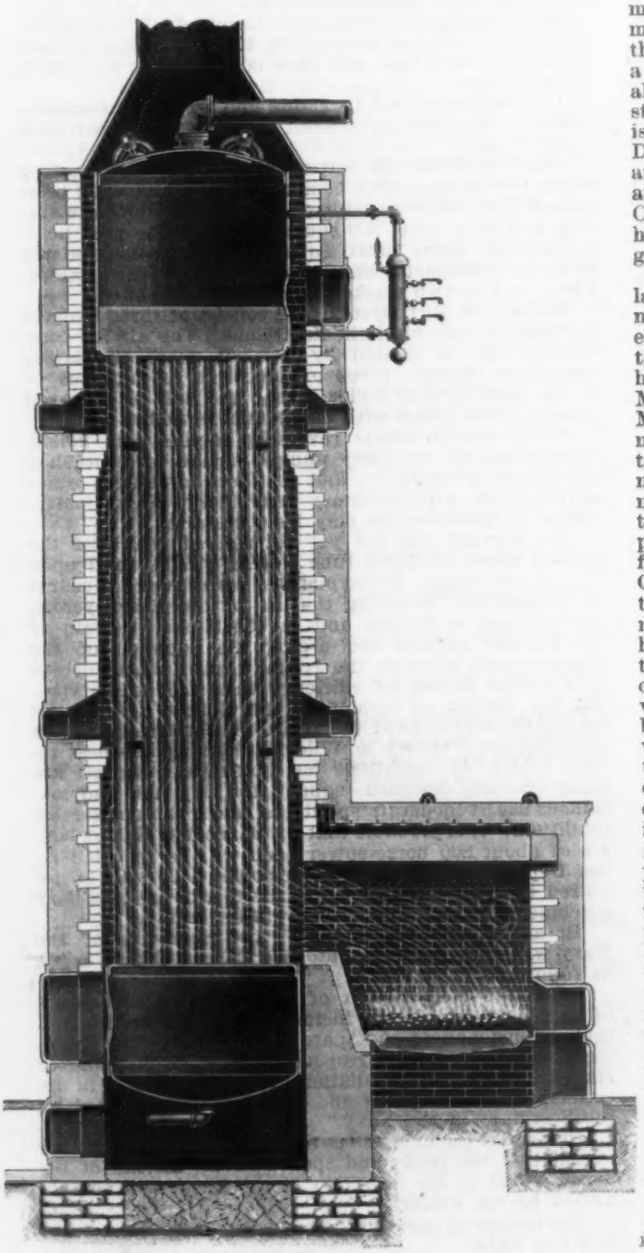
Artistic Bronze Work.

There has been recently cast in the brass foundry of J. J. Ryan & Co., 68 to 74 West Monroe street, Chicago, a bronze medallion 18 x 30 inches in size, designed for a monument to be erected at Atchison, Kan., in memory of John A. Martin, who was Governor of that State from 1885 to 1889, and who was not only prominent politically but also as an editor and further had a brilliant record in the Civil War. The medallion is a fine portrait of the Governor and represents great skill on the part of the molder. A companion piece to the medallion is a bronze tablet, giving a short biography and setting forth the purpose of the monument. Few establishments are in a position to turn out work of this character, which requires not only an accurate knowledge of the mixing of metals but also much experience in the preparation of the necessary mold. The firm have had a great deal of work in this line.

The Southern Car & Foundry Company, who were incorporated under New Jersey laws last month, have certified to an increase of capital stock from $750,000 to $3,500,000. Of this stock $1,750,000 is preferred.

The Lynn Water Tube Boiler.

The Lynn boiler consists of an upper and lower drum connected by a series of straight tubes. It is constructed wholly of wrought metal and the design is such as to make all parts accessible for cleaning and repairs. Each drum is provided with a manhole and the upper drum is large enough to permit a man to stand upright. Any tube in the boiler can be removed through one of four manholes placed in the top head of the steam drum. The boiler is supported by four heavy cast iron brackets riveted to the shell of the lower drum and does not come in contact with its brick setting at any other point, thus



THE LYNN WATER TUBE BOILER.

leaving it free to expand and contract. The tubes are so arranged that impurities in the feed water will be deposited in the mud drum, from which they can be readily blown off. The heating surfaces and combustion chamber are so arranged as to break up the currents of hot gases before they reach the stack. The furnace is external and the combustion chamber is roofed with a fire brick arch, which becomes incandescent shortly after the boiler has been fired and radiates its contained heat directly on top of the green coal. This boiler is built by the Tudor Boiler Mfg. Company of Cincinnati, Ohio, in units from 50 to 250 horse-power for a working pressure of 150 pounds.

We are indebted to G. F. Knapp, the Philadelphia representative of Oglebays Norton & Co., for a pocket analysis book of Lake Superior and Cuban ores. Full analyses are presented of the Ashland, Aurora, Montreal and Lawrence ores of the Gogebic range, the Granada, Lerida, Davidson, Badger and Clifford of the Menominee range, of the Adams, Hibbing, Hartley, Pillsbury, Sellers, Duluth, Ainslie of the Mesaba range and the Spanish-American of Cuba. Average analyses and shipments of all the lake ores for the season of 1898 are also appended.

Lake Iron Ore Matters.

DULUTH, May 14, 1899.—When ore shipments started it did not take long for them to become great, and the shovels are in the stock piles day and night now, something that does not usually begin till well into next month. The amount of ore that will go forward this month will far exceed that of any corresponding month in the history of the traffic. With this record in ore there is a similar movement of grain, and for the port of Duluth alone the present week has seen a reduction of grain stocks of more than 5,000,000 bushels, so that the fleet is pretty busy. There is a demand for ore from the Deseronto Charcoal Iron Company, at Deseronto, Ontario, and several small cargoes have been loaded the past week at Ashland for that works. This ore is smelted under the Ontario bonus on iron made in the province, whether from home or imported ores. It is probable that some ore will go there from the Minnesota districts also.

Interesting features of the iron mining situation in the lake country come up with regularity, and among them not the least important is the search for low grade properties everywhere, and notably on the old ranges. Of this class of work on the Menominee this correspondence has spoken at some length in the past few weeks. On the Marquette there is a great deal of work now under way. Much of this is on the Cascade range, an offshoot of the main Marquette, and containing a high silica ore in quantity. There are now known to be some 20 to 24 low grade mines in Marquette County, and in the past few weeks most of them have been examined, and several have been taken over by intending operators. The Volunteer is probably the most notable of those that have been taken for immediate reopening. This mine is handled by the Cleveland Cliffs Company, who have a lease from Secretary Alger and associates, who some years ago bought the mine for the great sum of $700,000. Needless to say it has been a white elephant on their hands since, and for three years has been idle. Its entire shipments since opening have been over 1 000,000 tons, and the new lessees will at once unwater, retimber and open for extensive business. It has very extensive stopes and is easily worked. Leases have been given of the East New York to F. A. Bates and others of Cleveland, and it is to be opened, they state. Mr. Bates has been mining on most of the lake ranges from time to time. The mine has been idle since 1891, but can be made a large producer, though how easily is a question, as its underground condition is probably bad. The Richmond, mined a few years ago; the Primrose, the latter hardly more than a prospect, and the Starwest, whose shipments have been large in times past, are either reopened or soon will be. The little and long deserted village of Palmer will take on new life, and 600 to 700 men will be employed in its immediate vicinity. The Hartford mine, Negaunee, is being unwatered, and in a month may be active underground. Cleveland Cliffs Company, who own Michigamme mine, have an option on the Beaufort and Titan mines close by, and will perhaps work all three. They have long been idle and are limonite deposits.

On the Menominee range the Florence mine is to be reopened soon under a reorganized company, and from 200 to 300 men will be set to work, if so many can be had, which is doubtful.

The outlook on the Gogebic is most encouraging. Besides the long abandoned mines on the west of the range in Wisconsin that are reopened, many options are being taken in that part of the range between the Colby and Newport, where explorations of years ago have shown much ore of good grade. Instead of 15 shippers, as last year, there ought to be some 23 the present season, and half a dozen more are getting ready for the following year. Of course the chief interest on this range is in the Carnegie properties, the Norrie group, Tilden and East Aurora, and these are now working 1400 men in Ironwood. The East Aurora mine will be explored later, as will other lands recently secured near town. What is claimed to be a very large find of ore, so close to the surface that it can be mined in open pit, has been found near Ironwood in the Davis property. Explorations have been under way for a year, and a width of ore of more than 75 feet is shown by test pits, with neither limit determined. The ore has not been proved in depth, though a pit has been sunk some 40 feet. It is non-Bessemer and rather low in iron, but as the ore comes to the surface can probably be made very good use of.

On the Minnesota ranges there is little that is new. Railroads are actively at work getting to stock piles, and the construction of the Eastern Minnesota along the Me-

saba range will soon begin. The activity of explorations on both the Minnesota ranges is becoming a fever and for miles crews are working, in many cases with excellent prospects. Ore shipments from the Duluth & Iron Range Docks last week ran over 130,000 gross tons, with 34 steamships at dock, among them the magnificent new "Pennsylvania," bought of A. B. Wolvin and others of Duluth by the Federal Steel, and on her first trip. This is without doubt the finest ship on the lakes in completeness of appointments and fittings, and will enter the fleet of the Minnesota Steamship Company at once. She is notable in having mechanical stokers and water tube boilers with 2-inch tubing, being in both items an innovation, and as near as can be so far told a successful one.

The shortage of men continues on all ranges, and the mine that has its workings fully equipped with labor is the exception, wherever it may be. This is a fact that should be emphasized, for it is of the utmost importance. Wages have been advanced within the week, now being based on about $1.75 for common hands, and a further advance is not out of the probabilities. There is a steady though slow exodus of Cornishmen from the old ranges for the copper fields, and this is causing some anxiety on the part of captains.

The Carnegie Company have secured another mine, one that is of interest in connection with the remarks above about low grade properties. This is the Stevens, an immense body of low grade ore on the Mesaba range some 6 miles east from the most easterly of present workings, in township 59-15, and close to the Duluth & Iron Range Railway. A royalty rate of 15 cents a ton has been agreed to, and as the mine is supposed to contain many millions of tons this will net the owner, a Detroit lumberman, an excellent thing. There is some fine ore mixed with the bulk of low grade. The same company hope to get out 400,000 tons from their newly acquired Queen group at Negaunee, and are increasing their force as fast as possible with that end in view. Negaunee feels the added prosperity of the year as much as any town of the ranges. The company have begun exploratory work on a new option in the Menominee, on land at Iron River owned by J. A. Brady adjoining the Dober, also under lease to this company.

Jas. Russell, editor of the Marquette *Mining Journal*, has been made mineral commissioner of Michigan. The appointment is an excellent one, and Mr. Russell will fill with satisfaction the place so long and ably held by Geo. A. Newett of the Ishpeming *Iron Ore*. D. E. W.

The Engines of the New Protected Cruisers.

WASHINGTON, D. C., May 16, 1899.—The Board of Construction of the Navy Department has completed the work of designing the engines of the six new protected cruisers for which proposals will be advertised for in the course of a few weeks. The new ships will be known as the "Denver," "Des Moines," "Chattanooga," "Galveston," "Tacoma" and "Cleveland," will have a displacement of 3200 tons each and a speed of 16½ knots. Their bunkers will have a coal capacity of 800 tons, giving a steaming radius at maximum speed of 2796 knots and a radius at 10 knots per hour of 6925 knots. As previously stated in these dispatches the hulls will be sheathed and coppered with a view to obviating the necessity for frequent docking, especially while on distant foreign stations. Following is a general description of the engines, which will be notable for some important departures from plans heretofore employed:

The propelling engines will be rights and lefts placed in separate water tight compartments. They will be of the vertical, inverted cylinder, direct acting, triple expansion type, each with a high pressure cylinder 18 inches, an intermediate pressure cylinder 28¾ inches and two low pressure cylinders 35½ inches in diameter, the stroke of all pistons being 30 inches. The collective indicated horse-power of propelling and circulating pump engines will be 4500 when the main engines are making about 172 revolutions per minute, with a steam pressure of 275 pounds in the boilers, reduced to 250 pounds at high pressure cylinders. The propelling engines will be placed in water tight compartments.

The sequence of the location of the four cylinders from the forward part of the vessel will be as follows: First, low pressure, high pressure, intermediate pressure; second, low pressure. The main valves will be of the piston type for the high pressure and the intermediate pressure cylinders, and the low pressure cylinders will have slide valves, all worked by Stephenson link motions with double bar links.

The valve gears will be made interchangeable as far as practicable. There will be one piston valve for each high pressure cylinder and two for each intermediate pressure cylinder, and one slide valve for each low pressure cylinder. Each main piston will have one piston rod, with a cross head working on a slipper guide. The framing of the engines will consist of forged steel columns in front and back. The engine bed plates will be cast steel. The crank shaft for each engine will be forged in two pieces, the shaft for the forward low pressure and the high pressure cylinders forming one piece, and the intermediate pressure and the after low pressure cylinders forming the other piece. All crank, thrust and propeller shafting will be hollow. Any other system of balancing the rotating and reciprocating parts will be taken into consideration by the Bureau of Steam Engineering. The shafts, piston rods, connecting rods, valve rods, eccentric rods and working parts generally will be forged nickel steel.

There will be a vertical, single acting air pump work from the cross head of the forward low pressure cylinder. The main circulating pumps will be of the centrifugal type, one for each main condenser. The two auxiliary condensers will have about 450 square feet of cooling surface each and will have combined air and circulating pumps.

The propellers will be rights and lefts of manganese bronze or approved equivalent material. They will turn from the ship.

There will be six water tube boilers, aggregating about 4700 horse-power, constructed for a working pressure of 275 pounds per square inch. The total grate surface will be at least 300 square feet and the total heating surface about 13,200 square feet. The boilers will be in two compartments, with fire rooms athwartships. There will be two smoke pipes for all the boilers.

The forced draft system will consist of three blowers discharging into air tight fire rooms. The air for combustion will be heated by the hot gases circulating among or through tubes arranged in the uptakes or in the upper part of boiler casing, and will be conveyed through ducts fitted with dampers to closed ash pits.

There will be steam reversing engines, ash hoists, turning engine, auxiliary pumps, engine for workshop machinery, evaporators and distillers, and such other auxiliary or supplementary machinery, tools, instruments or apparatus as may be necessary.

The Bureau has not yet determined which of the leading types of water tube boilers will be fixed upon for the new ships. Three plans of batteries are in course of preparation, involving the use of the Thorneycroft, the Babcock & Wilcox and the Niclausse. Certain of the Bureau experts are urging the adoption of the Thorneycroft boiler on the ground that it can be driven to a higher degree of efficiency than the other types, but the weight of opinion in the Bureau, as well as among the members of the Board of Construction, is in favor of the Babcock & Wilcox as giving the best results under the conditions for which these vessels are being specially designed—namely, for long runs and continuous use at moderate speed and under normal service conditions. It is probable that six Babcock & Wilcox boilers of about 800 horse-power each will be specified by the Department. Of this horse-power 4500 will be required to drive the vessel and 200 to run the auxiliary machinery, leaving a small margin for safety.

In advertising for proposals the Secretary of the Navy will divide the bids into two classes, Class I being as follows:

"For the construction of the hull and machinery of each of said vessels, including engines, boilers and their appurtenances and spare parts, and for the equipment complete in all respects except as hereinafter stated, and for the installation of ordnance outfit in accordance with the plans and specifications provided by the Secretary of the Navy."

Class II of the bids will cover exactly the same ground except that the plans and specifications, instead of being provided by the Secretary of the Navy, will be submitted by the bidder.

The details of hull and armament will be determined in a few days. W. L. C.

A conference was held in Pittsburgh last week between officials of the Amalgamated Association and the secretary of the Association of Iron and Steel Sheet Manufacturers. It was found that the average selling price of Nos. 26, 27 and 28 gauges, black steel sheets, for March and April did not warrant an advance in wages of sheet mill hands. While it is true that the average price of the three gauges of black sheets mentioned in March and April were higher than 2.5 cents, yet the wage rate is based on the average price of shipments made by the mills, and as a large part of the product shipped was based on old contracts the average price obtained did not warrant an advance in wages.

L. O. G. Amundsen, acting consul of the Consulate of Denmark, New York City, desires for a correspondent catalogues and price-lists from American firms that manufacture tools and machinery for engineering and shipbuilding yards.

Mechanical Engineers.

The members devoted Wednesday to sightseeing and visited many of the interesting points in and about Washington. This work, or pleasure, according to the aim of the visitor, was materially assisted by a system of cards provided by the local committee. These were of convenient size and each was devoted to some particular department, building or site. It contained the address, traveling directions whenever necessary, brief description, names of those to inquire for and names of those of the local committee capable of giving more extended information. As an illustration of the thoroughness with which the scheme was carried out a card was provided giving various bicycle routes, and another with the addresses of dealers, the number and pattern of the bicycle each had for rent, and the charges.

Members in Attendance.

In addition to those published last week, the following members were in attendance at the several sessions:

Alden, George I., Professor Mechanical Engineering, Polytechnic Institute, Worcester.
Aldrich, William Sleeper, Professor Mechanical Engineering, West Virginia University.
Allison, Robert, Franklin Iron Works, Port Carbon, Pa.
Archer, Edward R., Chief Engineer Tredegar Company, Richmond, Va.
Baldwin, Stephen W., New York Agent Pennsylvania and Maryland Steel Companies.
Barnes, Abel T., Contracting Engineer (for B. F. Sturtevant Company), Boston.
Blankenship, R. M., General Superintendent Old Dominion Iron & Nail Works, Richmond, Va.
Blessing, James H., Secretary Albany Steam Trap Company, Albany, N. Y.
Bole, Wm. A., Superintendent Westinghouse Machine Company, Pittsburgh.
Bonner, William T., Manager for Canada, Babcock & Wilcox, Limited, Montreal.
Boyer, Francis Howard, Chief Engineer John P. Squire & Co., East Cambridge, Mass.
Brashear, John A., Astronomical Instrument Manufacturer, Allegheny City, Pa.
Cheney, Walter L., Secretary Meriden Machine Tool Company, Meriden, Conn.
Christie, James, Chief Engineer Pencoyd Iron Works, Pencoyd, Pa.
Comly, George N., General Manager Solvay Process Company, Syracuse, N. Y.
Cooper, Henry R., Manager Caustic Soda Department, Solvay Process Company, Syracuse, N. Y.
Crain, John Jay, Newport News Ship Building Company, Newport News, Va.
Darling, Edward A., Superintendent Buildings and Grounds Columbia University, New York.
Deane, Charles P., President Deane Steam Pump Works, Holyoke, Mass.
Detrick, Jacob S., President Detrick & Harvey Machine Company, Baltimore.
Doran, William S., Engineer with Henry R. Worthington, Philadelphia.
Drewett, Wm. A., Superintendent Davidson Steam Pump Works, Brooklyn.
Du Bosque, F. L., Assistant Engineer Floating Equipment Motive Power Department, Pennsylvania Railroad Company, Jersey City.
Felton, Edgar Conway, President Pennsylvania Steel Company, Steelton, Pa.
Ferguson, George R., Assistant Engineer Department of Bridges, New York.
Fritz, John, Chief Engineer Bethlehem Iron Works, Bethlehem, Pa.
Frothingham, Francis Edward, Westinghouse, Church, Kerr & Co., New York.
Gould, Webster V., Jones & Lamson Machine Company, Springfield, Vt.
Griffis, Chas. Lewis, Assistant Professor, Machine Design, Pennsylvania State College.
Grohmann, Carl Ludwig, Chief Draftsman, Pratt & Whitney Company, Hartford.
Hagar, Edw. McKim, Edward M. Hager & Co., Chicago.
Hayward, H. S., Superintendent Motive Power, United Railroads of New Jersey, Jersey City.
Higgins, Milton P., President Norton Emery Wheel Company and Plunger Elevator Company, Worcester.
Hunt, Charles Wallace, 45 Broadway, New York.
Jones, David P., Chief Engineer United States Navy, Pittsburgh.
Jones, Forrest R., Professor of Machine Design University of Wisconsin, Madison, Wis.
Kafer, John C., Superintendent Morgan Iron Works, New York.
Keller, Emil E., General Manager Westinghouse Machine Company, East Pittsburgh, Pa.
Kendall, James Henry, Edward Kendall & Sons, Cambridgeport, Mass.
Kerr, C. V., Professor Mechanical Engineering Armour Institute of Technology, Chicago.
Knickerbacker, John, President Eddy Valve Company, Waterford, N. Y.
Leitch, Meredith, Supervising Engineer Warren Webster & Co., Boston.
Lewis, Wilfred, Assistant Engineer for Wm. Sellers & Co. (Incorporated), Philadelphia.
Logan, John D., Superintendent Logan Iron Works, Brooklyn.
Manning, Chas. Henry, General Superintendent Amoskeag Mfg. Company, Manchester, N. H.
Manning, Henry Geer, Mechanical Engineer Simonds Mfg. Company, Fitchburg, Mass.
Mansfield, Albert K., Mechanical Manager Buckeye Engineering Company, Salem, Ohio.
Meier, E. D., Engineer in Chief Diesel Motor Company, New York, and President Heine Safety Boiler Company, St. Louis.
Mesta, George, President Leechburg Foundry & Machine Company, Pittsburgh.
Miller, Spencer, Mechanical Engineer, 96 Liberty street, New York.
Moore, Charles A., Manning, Maxwell & Moore, New York.
Moore, D. G., President S. L. Moore & Sons Company, Crescent Iron Works, Elizabeth, N. J.
Morgan, T. R., Secretary Wellman-Seaver Engineering Company, Cleveland.
Naylor, Ernest W., Manager Hydraulic Department Pennsylvania Iron Works Company, Philadelphia.
Neff, Elmer Hartson, New York Representative Brown & Sharpe Mfg. Company.
Nichols, O. F., Principal Assistant Engineer New East River Bridge, Brooklyn.
Porter, Chas. T., Montclair, N. J.
Reed, Wm. E., Warner & Swasey, Cleveland.
Reynolds, Irving H., Engineer Water Works Department, E. P. Allis Company, Milwaukee.
Riddell, John, Supervisor Machinery and Tools, General Electric Company, Schenectady, N. Y.
Rohrer, Albert L., Electrical Superintendent General Electric Company, Schenectady, N. Y.
Ross, E. L., M. E. Chapman Valve Mfg. Company, Indian Orchard, Mass.
Schuhmann, George, Superintendent Scott Foundry Department, Reading Iron Company, Reading, Pa.
See, Horace, Engineer and Naval Architect, 1 Broadway, New York.
Smith, Oberlin, President Ferracute Machine Company, Bridgeton, N. J.
Spilsbury, Edmund Gybbon, Managing Director Trenton Iron Company, Trenton, N. J.
Sweet, John E., President Straight Line Engine Company, Syracuse, N. Y.
Tallman, Frank G., Brown Hoisting & Conveying Company, Cleveland.
Tyler, Chas. C., Superintendent the Pratt & Whitney Company, Hartford.
Veeder, Curtis H., President Veeder Mfg. Company, Hartford, Conn.
Waldo, Leonard, the Waldo Foundry, Bridgeport, Conn.
Warren, B. H., Vice-President Westinghouse Electric & Mfg. Company, Pittsburgh.
Wellman, Charles H., Superintendent Wellman Iron & Steel Company, Cleveland.
Wheeler, F. Meriam, George F. Blake Mfg. Company and Wheeler Condenser & Engineering Company, 93 Liberty street, New York.
Whitlock, R. H., Professor Mechanical Engineering Texas State Agricultural and Mechanical College, College Station, Texas.
Wood, W. H., Media, Pa.
Woolson, Wm. D., Treasurer, Jones & Lamson Machine Company, Springfield, Vt.
Wright, James Knox, Wright engines, 136 Liberty street, New York.
Young, William S., Manager New York office, Dean Steam Pump Company.

The first paper read Wednesday evening was that of Gus C. Henning on "Investigations of Boiler Explosions," which was presented in full in our last issue.

R. S. Hale had a paper on

"Boiler and Furnace Efficiency."

The author divided his paper into "definitions," which dealt with the features required; tests and methods pursued in same; causes of hydrocarbon loss; efficiency of heating surface; air supply. The final paragraphs are as follows:

"In designing or selecting a boiler have the furnace roomy, and, if practicable, line it with brick in order to have a very high furnace temperature.

"Pay especial attention to the furnace if poor coal is to be used. Get rid of air leaks after the gases have left

the hot furnace. Proportion the boiler so that at least 15 pounds of coal per square foot of grate must be burned to develop its horse-power, and so to keep the rate of evaporation per square foot of heating surface low. This involves a moderately high ratio of heating to grate surface.

"The horizontal return tubular boilers appear, all things considered, to be the type of boiler for best economy of steam production, although the internally fired boilers are probably as good if the furnace is roomy and the firing careful. The Thorneycroft boiler, which (from a combustion point of view) is of this type, shows the best result of all.

"Certain of the water tube boilers suffer from air leakage and from short circuiting of gases if underworked. Of course the advantages of water tube boilers often make their choice advisable, even at the possible expense of a slight loss in efficiency.

"The Lancashire type suffers from air leakage and the furnace is poor.

"Stokers save nothing over hand firing, either in better combustion or less air supply. This does not necessarily apply to all stokers and it should be remembered that, even if it should finally prove to be true that stokers are no more efficient than hand firing, yet saving in labor and smoke may pay good returns on their cost.

"Down draft grates show up well, both in good combustion and small air supply, but the number of tests is too few to allow final conclusions to be drawn.

"The results show that present knowledge enables the boiler efficiency to be predicted reasonably well, provided the efficiency of combustion and the air supply are accurately known, and although these quantities themselves cannot as yet be accurately predicted, yet it is shown that the temperature of the furnace is at least one factor in the question of good combustion, and that rate of burning per square foot of grate affects the air supply.

"The most pressing need, therefore, in the study of boiler efficiency is the further determination of the factors that govern the efficiency of combustion and the air supply. The latter can be studied by the means of taking gas analysis at the bridge wall for different methods, or frequency of firing, thickness of fire, &c. The factors governing efficiency of combustion can only be determined by carefully conducted and complete tests with heat balance. In this connection it should be noted that one or two accurate tests in which all the quantities, such as thickness of fires, gas analysis, &c., are observed, are, for the purpose of increasing our knowledge of boiler efficiency, worth a thousand tests in which the efficiency or evaporation is measured alone."

The next paper was on test of a steam separator by F. L. Emory. The apparatus was that of the baffle plate pattern separator, designed to serve as a live steam separator, as an exhaust steam separator or trap and as an oil separator.

Prof. F. L. Emory of the West Virginia University discussed the relation between the initial tension and the power transmitted by a belt. A graphical illustration was presented of the use of the formula deduced and a problem was solved to show the practical use of the curve.

The paper by Charles L. Newcomb of Holyoke, Mass., on "Experiments on Various Types of Fire Hydrants," described tests which had for their object a complete investigation of the fire hydrants now commonly used. The work was diveded into the following classes: The loss of pressure due to the friction of water in the hydrant, the total loss being subdivided into barrel loss and nozzle loss. The discharging capacity of open hydrant butts at different pressures. The water hammer caused by quickly closing the main gate. General features of construction, certainty of action, strength, durability, &c. The results obtained are of the greatest value, and are presented in such form as to permit of easy reference and examination.

Prof. G. W. Bissell of the Iowa State College, described

Experiences with Pump Rods

in connection with the deep well which constitutes the principal water supply of the college. The well has a total depth of 2215 feet, and varies in diameter from 12 inches at the top to 5 inches at the bottom. The normal level of the water in the well is 25 feet below the surface of the ground, but the pump holds it at about 220 feet

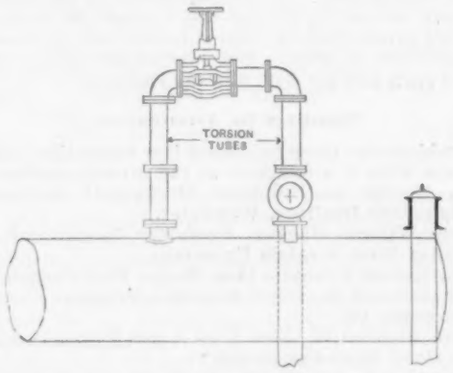


Fig. 2.—Illustration of Use of Pipe.

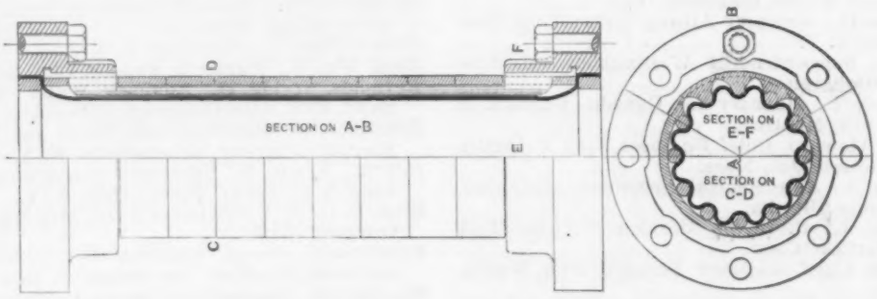


Fig. 1. The Nagle Pipe.

PIPE FLANGES AND THEIR BOLTS.

below the surface. The cylinder containing the pistons is hung at a depth of 300 feet. The cylinder is 5¾ inches internal diameter, and of a length suitable for the movement of the two single acting pistons, each of 24 inches stroke. Each piston is attached to a string of rods, that for the lower piston working within that for the upper. In addition to lifting the water to the surface these pistons deliver it to an elevated tank, having a water level 150 feet above the surface. Thus when pumping 8000 gallons per hour the pistons lift the water against a total head of 370 feet. In order to move the water without shock under these conditions the working strokes of the pistons not only alternate, but overlap. The inside string of rods originally furnished by the makers of the pump was 1⅛ inches diameter in the body, the ends being upset for a 1¼-inch bolt thread, and had square shoulders for wrenches. The couplings were extra heavy, and tapped parallel so that the rods would come together. The outside string of rods consists of 2-inch pipe, ends upset and connected by very heavy couplings. These rods are made up with pipe tools.

The pump was installed in the fall of 1897. On January 16, 1898, the inside rods parted. Examination showed that many of the inside rods were badly worn at the joints, and that one coupling had been so far reduced as to have parted under the working strain. Some couplings on the outside rods also showed considerable wear. This fact was taken to indicate that the drop pipe might be crooked, due to lack of straightness in itself or in the casing of the well. Accordingly the profiles, in two planes, of the center line of the drop pipe were determined by means of a wire cage lowered by a steel wire into the drop pipe from a fixed point vertically over the center of the top of the drop pipe. Deviations of the wire from the center as the cage descended gave data for plotting the profiles. Where the drop pipe was out of line brass winged guides, loose on the outside rods and having broad shoes bearing loosely on the inside of the pipe, were inserted. Very little wear of the rod couplings or of the guides themselves has since been ob-

served. A second failure of the inside rods occurred in February, 1898, and new rods were put in place soon after. These were made of extra heavy 1-inch pipe, with ends welded on and provided with couplings smaller than the body of the rods. The rods were removed for inspection in March, 1899, and found to be in good condition.

"Pipe Flanges and Their Bolts"

was the title of a paper by A. F. Nagle of Chicago, of which the following is an abstract: There is probably no part of a steam plant which presents so untidy, so incongruous an appearance as the exposed pipe flange joint. The engine itself is handsomely finished, and all its steam joints are steam tight and covered in a substantial manner with nonconducting material and sheet steel. But we do not get away from this finished and polished machine before we are offended by the sight of rough, uncovered and hot pipe flanges. Why is this unsightly practice continued? Why should not a simple little round pipe joint be made as steam tight as any part of the engine?

The practical engine man will tell you that all these steam pipe joints are liable to leak or blow out at any time, and hence he wants to have easy and quick access to them, which he would not have if they were covered. Here is a confession of a weak point in our steam engineering practice that should not be allowed to go on forever.

It can scarcely be imagined that it is difficult to make a single flange joint steam tight when undisturbed by an extraneous force. The fact, however, is that in a modern large steam plant the elongations due to heat are irresistible, and provision must be made to take care of them. This is not always easy to do within the limited space at command, but it may be set down as a guilding principle that wherever possible it is better to let these expanding forces come upon torsional resistances rather than in the form of transverse stress upon the pipe and its flanges. Flexure produces a strain upon the bolted joint which it is not able to stand to any appreciable degree without opening up the joint, but torsion is easily resisted by a bolted joint to any degree even to the point of twisting the pipe to destruction, should it not possess sufficient flexibility to give the required amount of angular motion.

The author then analyzes the forces at work upon a flange joint, its bolts and gasket, for the standard high pressure flanges, 250 pounds per square inch. The author states that in order to carry out more completely his idea of relieving flange joints of all transverse stress, or flexure, and substituting, so far as possible, torsional strains therefor, he designed a pipe construction which admits of torsional movement to a large degree without straining either the material of the tube or the flange joint to any appreciable extent. It is shown in Fig. 1 and consists of what might be termed stave construction instead of solid pipe. These staves are steel rods securely fastened to the flanges. Exterior to these staves are strong iron or steel enveloping rings. Interiorly is a thin, longitudinally corrugated copper tube also securely fastened to the end flanges. We now have a pipe which is strong in every direction but one—namely, that to resist torsion. With these flexible tubes put in in the proper manner all elongations of steam pipes should be easily taken care of and without straining any joint to a dangerous degree. An example is shown in Fig. 2.

"I do not intend to patent this form of pipe, and hence it can be made by any one who chooses to do so."

Discussion.

Mr. Fritz explained a joint which he has used for many years, which will stand any pressure, will always remain tight and which is easy and cheap to make. The solid flange joint is shown in Fig. 3. A groove and tongue are cut in the ends of the pipe at *a a*. A strip of copper is inserted in the groove and the ends bolted up. The thinner the copper the better the joint. In the straight pipe joint, Fig. 4, collars are screwed on the ends of the pipe, a groove and tongue, *a a*, are formed, as in the other case. Then the copper strip is inserted and the parts bolted together.

The next paper on the list was on the manufacture of car wheels by G. R. Henderson of Schenectady. The author considered foundry mixtures, and presented the following, which he considered to be the desirable limits for the chemical constituents of wheels:

Desirable Wheel Analysis.

	Per cent.
Graphite	2.75 to 3.00
Combined carbon	0.50 to 0.75
Silicon	0.50 to 0.70
Manganese	0.30 to 0.50
Sulphur	0.05 to 0.07
Phosphorus	0.35 to 0.45

A graphic illustration shows the comparison between chemical analyses of pig iron and of the test bar made by remelting the pig in a cupola by itself. Twenty-seven different irons were examined in this way. The phosphorus remains constant, as does silicon when present in quantities under 1 per cent., whereas some of the manganese always disappears. The total carbon remains the same, but the proportions of graphitic and combined carbon seem to vary in an erratic manner. This is evidently due to the effect of the chill, as the analyses were made from the chilled test bars when possible. From the above it will appear that the metal charged into the cupola should contain more graphite, silicon and manganese and less combined carbon than are desired in the finished product.

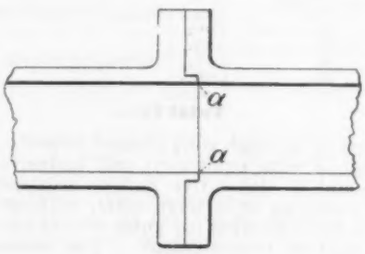


Fig. 3.

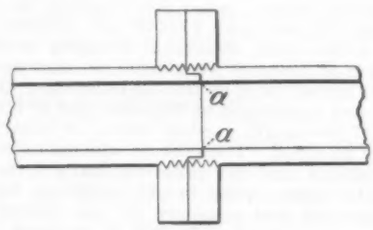


Fig. 4.

The Fritz Pipe Joint.

If the iron in stock is deficient in manganese the proper amount can easily be added to the mixture in the ladle by the use of ferromanganese containing about 80 per cent. manganese, 13 per cent. iron, and 6 per cent. carbon (combined). The use of large proportions of scrap makes this particularly useful, and it is of great assistance in enabling the wheel to stand the thermal test and consequently the strains from severe braking when in service.

The author closes with a set of specifications covering the material, defining the testing and naming the allowed limits in the finished wheel.

"Equipment of Tall Office Buildings in New York City,"

was by R. P. Bolton of New York. This paper dealt mainly with the power equipment of office buildings.

In a space in the lower part of New York City 1 mile in length and two-thirds of a mile in average breadth there are at present located some 56 buildings exceeding 180 feet in hight, while a few of these range from 200 to 325 feet from the sidewalk level. The demand for office accommodation in this district began in the vicinity of the Stock Exchange, and has developed buildings up the line of Broadway and parallel streets as far north as Franklin street and as far south as Bowling Green. The convenience of the various exchanges has grouped the different professions and contributing trades in certain districts, and the legal profession has been attracted to the district around the municipal buildings and the courts in City Hall Park.

While at first, when there were few such examples, they returned a fairly profitable investment without much regard to economy of operation, yet in recent years the construction of so many great buildings has brought about a sharp competition which has called attention to economical equipment and operation, and has directed

the attention of engineers to the problems which they offer.

The author showed that the cost of land in desirable downtown localities had reached as high as $300 per square foot. Such large amounts as these values represent naturally call for a large return from the building occupying the site, such return being obtainable in the old five and six story buildings only by means of increased rentals. High rentals had, however, the reflex effect of driving tenants to less advantageous locations in rear streets, until the hight attainable in the modern buildings effected a combination of improved accommodation at a reasonable price. The effect of the above natural causes has been, therefore, even with a greatly enhanced cost of the site, a reduction in renting charges proportioned to the increase in rentable area. The competition between the various buildings has brought the minimum rate down from $3 per square foot to below $2 per square foot of office space, and includes in this charge light, heat, attendance, cleaning, and, of course, elevator service.

It may be roughly estimated that the increased hight of the downtown buildings referred to has added to the inhabitable area not less than 7,500,000 square feet. Illustrating the relative increase of value obtained by hight, the four and five story buildings occupying the site of the present German-American Building represented a renting area of not more than 6000 square feet per floor, which at the old rate of about $3 per square foot per annum may have produced a gross rental of as much as $70,000 per annum when filled, but even this represented only 6 per cent. on the real value of the land alone. The new building has a net renting area of about 7000 square feet per floor, producing on 14 upper floors, even at the low average of $1.60 per square foot, $156,000, in addition to which are two large ground floor banking parlors producing about $17,000 and $12,000 per annum respectively, also a basement restaurant bringing in $3000, or a gross return of $188,000 per annum, an increase of two and a half times as much as the old buildings. On a cost for building and equipment of $650,000, and of land $937,000, or $1,587,000 in all, a gross return of nearly 12 per cent. is thus attained. The cost of management, operation of equipment, and city taxes naturally form a large increase on the same items in old buildings, but under good management and economy do not exceed 50 per cent. of the gross rental. It will be evident that the economical operation of the equipment forms a decided factor in the net balance available for interest.

As a mortgage can be placed on such a building and land for six-tenths of its value at a rate not exceeding 4 per cent., the net return on the actual capital sunk in such a building may be very high, nevertheless wasteful appliances and accompanying cost of management reduce the return in many instances down to 3 per cent. Once such buildings with moderate rentals and greatly increased advantages are established, they form a strong incentive to the erection of other buildings of similar or superior character owing to gradual abandonment of the older buildings by tenants in favor of those where they find better conditions. The sanitary appliances in the older buildings were and are extremely behind the times, and have in numerous cases been the cause of tenants' removal. The old three and four story buildings on the site of the Bowling Green Building, from the above causes, became unremunerative, and some were closed up to avoid taxation. The site, which fronts 157 feet on Broadway, extends 170 feet through to Greenwich street, and was valued at a million dollars by the building company. On this site the Bowling Green Offices have been erected, which is the largest commercial office building in New York City, being 240 feet 6 inches average hight from street levels, and of a gross content of 4,915,000 cubic feet, with a floor area of 20,555 square feet on 15 upper floors, and of 32,000 square feet on the ground floor and first basement, the subbasement being devoted to mechanical services and storage. In this instance the increase in acreage has been enormous, the original 80,000 being raised to 567,500 square feet, or fully four times greater renting area than before. The total cost of the building was close on $2,000,000, and, owing to the remarkable economy of its equipment and management, it has been able to pay its way when not more than five-eighths occupied.

Size of Buildings.

The best method of comparison of size is that afforded by bulk. Representative instances are the following:

The Bowling Green Offices, 16 stories above street, 235 feet high, 5,000,000 cubic feet gross contents.

New York Life Building—partly insurance—16 stories, 4,800,000 cubic feet.

Manhattan Life Building—partly insurance—17 stories and tower, 270 feet high, 1,665,000 cubic feet.

Lords Court Building—offices—220 feet high, 3,000,000 cubic feet.

American Surety Building—partly insurance—21 stories, 305 feet high, 2,176,000 cubic feet.

These represent either abnormal hight or bulk, and of them the Bowling Green and Lords Court buildings are those built on a strictly commercial basis.

The representative commercial office building now averages 200 feet high, and of these there are now a large number.

Average samples are:

The Central Bank Building, 16 stories, 1,980,000 cubic feet.

The German-American Building, 15 stories, 1,400,000 cubic feet.

The Hudson Building, 16 stories, 1,500,000 cubic feet.

R. G. Dun Building, 15 stories, 1,200,000 cubic feet.

The above buildings also afford an opportunity for interesting comparison on account of the dissimilarity of their elevator systems:

		Boilers. Horse-power.
1.	Bowling Green Offices, 9 hydraulic elevators	720
2.	Lords Court Building, 5 electric elevators	420
3.	Central Bank Building, 5 hydraulic elevators	460
4.	German-American, 5 electric elevators	320
5.	Hudson Building, 4 hydraulic elevators	500
6.	R. G. Dun Building, 6 electric elevators	600

All of the above have been equipped to the plans of the author, and are, with the exception of the last, heated by the Webster system of vacuum returns with exhaust steam at atmospheric pressure.

The boiler capacity includes, in all but the last instance, a spare or reserve boiler. The R. G. Dun Building has a single pipe back pressure system of steam heat, and has only two boilers, both being in use in extreme weather.

The services provided in each are:

	Car miles per hour.	Lights.	
1	14 to 20	6,200	Bolton vertical system of wiring.
2	9½	4,000	
3	11	3,800	
4	11	2,800	
5	8	3,000	Horizontal wiring.
6	16	4,500	

Total Cost.

The cost of average steel framed 16-story office buildings complete with equipment and inclusive of a moderate amount of decorative outside treatment in stone machine moldings or in terra cotta, without hand stone carving, is 36 to 40 cents per cubic foot of the gross cubic content, outside measurement. The excessively high buildings cost more, also those with expensive adornments. The relative cost of the mechanical appliances, including power, elevators, heat, light and sanitation, is approximately one-seventh of above. The total cost of mechanical appliances in a building of 16 stories, basement and subbasement, say 6000 square feet renting area per floor, was $82,000.

Or in detail:

	Cost.
Chimney	$1,200 to $2,500
Boiler plant	9,000 to 11,000
Four to six elevator plant	28,000 to 40,000
Heating appliances and piping	14,000 to 17,000
Electric wiring and switchboard	9,000 to 15,000
Engines and generators	8,000 to 10,000
Sanitation and fixtures	12,000 to 15,000

The effect of an increase in the cost of these appliances, if the same be productive of economy and advantage in operation, is very much less in proportion than its importance to the owner. For instance, the difference in the above comparative costs would amount to $26,000, say 4½ per cent. on gross cost of building, which would represent fully 50 per cent. more convenience and the best appliances for economy throughout. It has, however, been difficult at times to induce owners to spend on economical appliances a small fraction of the sum laid out on non-remunerative outside or interior adornment.

The difference between a compound and a triple expansion pump may be, say, $1500, and be begrudged, while the difference between marble trim and other substitutes in the hall will be $15,000 and be freely expended.

These are difficulties met by engineers everywhere, yet in no case do they appear so forcibly. It is satisfactory to relate that such instances have been rather due to the present faulty system of letting general contracts inclusive of machinery than to the owners' shortsightedness as regards the advantage offered.

Equipment.

The value of office buildings to the business community is based on the improvements they offer, which are chiefly of a mechanical character, and further examination of the requirements will make it evident that the importance of the mechanical equipment considerably outweighs the value of any architectural features.

The details of direct interest to mechanical engineering science in these great buildings may be grouped as follows:

The character and arrangement of mechanical plant.

Elevator service and the limitation of the hight of buildings by the proportions of same.

Piping and connections.

The power plant, chimneys, coal supply, feed heating and waste heat.

Heating, ventilation and refrigeration.

Fire protection and water supply.

Electric lighting, wiring, generators and storage batteries, telephone and electrical services.

It will be obvious on a moment's thought that each one of these subdivisions is of sufficient importance, if treated with any fullness, to exceed the limits of a single paper. It is the object of the author at present to refer briefly to some of the problems connected with the arrangement of the mechanical plant of such an office building, as determined by the usual conditions which are prescribed.

The paper then enters a discussion of the location of piers, &c., the space, labor and so on.

Steam.

The steam supply is provided over the down town portion of the city at a pressure of 70 pounds per square inch, while an economical use can be made in these buildings of 100 or 120 pounds pressure. The price of the steam supply is proportioned on the extent of its use, yet on the largest and lowest basis it is in excess of the cost or local generation of steam. The case may be the reverse in smaller buildings, chiefly by reason of an economy in labor, but in the large office buildings a staff of men is necessary for maintenance and emergency work, and the wages of one fireman only represents about 16 per cent. of the full bill in an average building.

The New York Steam Company have abandoned their attempt to regain the condensed water from these buildings, their efforts having proved futile with their past apparatus. Consequently their steam is raised under less favorable conditions than is the case in the large buildings.

It would seem that successful extension of this steam supply in future largely depends on the adoption of the modern methods by which this desirable feature can be assured and their prices of steam thereby reduced. The difficulty of disposal of the hot condensed water from the large buildings is an objection to the use of this service.

Gas.

At the present price of $1.10 per 1000 cubic feet of gas a brake horse-power-hour can be obtained by a gas engine for a cost of 2 cents. This is certainly a low figure and one that enters very closely into competition with steam. There are, however, certain disadvantages in the use of gas engines for these large buildings which have hitherto deterred the author from their adoption. The great size of the units required is one, the liability to noise and to vibration is another. As the machines would be situated in the basement, the least vaporous smell of gas would be promptly objected to by tenants.

The question of irregularity of motion in lighting work can, no doubt, be disposed of by combination with a storage battery.

The same remarks apply to the use of the petroleum engine, which, however, is at present limited to units of not exceeding 50 effective horse-power. With these economical machines one brake horse-power can be obtained, at present prices of oil, for 1 cent per hour.

Electricity.

The electric supply of the illuminating companies forms the most serious competitor with an independent plant. At present prices for power the nominal rate is 10 cents per horse-power-hour by meter, and users of large quantities can scale this rate down to as low as 4 cents per electrical horse-power-hour on a use of 10,000 horse-power-hours per annum, with a still further reduction of about ½ cent if a storage battery be adopted.

But although the offer is of a temptingly simple and apparently advantageous character, a still further reduction in rates is required before the supply can compete with the results of a really economical independent plant. This reduction is probable, and, in combination with the storage battery and electric pumping for hydraulic elevators, the question will have to be reconsidered in the future. The charges must, of course, be increased by the cost of maintenance and interest on cost of the battery.

At the time of the establishment of the Bowling Green building a careful computation showed, at the net price for lighting current of 8 cents per kilowatt-hour, including lamp renewals, and at the then price for elevator power of 7 cents per kilowatt-hour, an advantage in favor of an independent plant exceeding $5000 per annum. The results of operation have shown a still larger advantage, as the plant was debited with the services of an engine room staff of nine men, whereas it is now operated by only five hands.

The item which largely operates in this comparison is the utilization of exhaust steam in house heating for the 100 or 120 days of cold weather.

The cost of a horse-power-hour for power, oil and repairs, generated by an independent plant, may be, with economic arrangements, as low as 2 4-10 cents, and a fair figure, inclusive of interest and depreciation, is 2 8-10 cents; adding one-half share of all engineering labor, which is more than its due, a covering figure is 3 8-10 cents.

The installation of an independent plant has, so far, been decided by these considerations and by its relative superior economy. In future it is quite possible that this economy will be on the other side, but the use of such plants will, nevertheless, probably continue on the ground of the desirability of independence of outside supplies.

Such an argument recently received forcible illustration when the entire steam supply of the New York Steam Company was cut off by the action of a Water Department foreman in turning off a valve in the main, the steam heat, elevators and lights of upward of 400 buildings being cut off from 3 p.m. to 9 p.m., causing most serious disorganization and loss.

The above considerations are those which lead up to and affect the decision to employ and install an independent plant in office buildings such as those described in this paper.

Discussion.

In answer to a question by Mr. Rockwood as to the reason for using storage batteries instead of the street mains, Mr. Bolton said that it would have cost the Edison Company thousands of dollars to have placed the conductors from their station to the building. Storage batteries were therefore introduced, the electric company renting the space they occupied at a small sum and the owners of the building being provided with necessary current at proportionately small figures—so all were happy. In regard to the use of the storage battery, Mr. Bolton said that an ideal plant was that of the R. G. Dun Building. Here the storage battery was placed on top of the building, where it occupied space having no rental value and where the question of ventilation and fumes was of no moment.

The other papers presented at the sessions will be considered in a later issue.

The New Little Giant Pneumatic Hammer.

The Standard Pneumatic Tool Company, Marquette Building, Chicago, have recently put on the market an important addition to their line of pneumatic tools. It is so light that one man can easily operate it, but the range of power is remarkable. The special features of the Little Giant hammer are the application of a regulator and the cushioning of the return stroke on the exhaust air. Air is admitted through the handle in the usual way, the throttle being opened by pressure on the trigger. The volume of the air admitted, however, is governed by the regulator, which has a dial showing the number of pounds pressure in use. Turning the dial increases or lowers the pressure at the will of the operator. Thus he can set it for a series of very heavy strokes or of quite light ones, pressing the trigger as hard as he pleases at all times. The hammer moves in a longer or shorter stroke according to the adjustment of the regulator, the rapidity of the strokes remaining the same. The air passages in the barrel of the tool are so arranged that the return stroke of the hammer cushions upon the exhaust instead of the live air, thus diminishing the consumption of air. It is claimed that 30 per cent. less air is consumed by this method of cushioning. A tight joint is secured by a positive locking device between the barrel and the handle. The hammer contains no delicate parts. It is made in four sizes. The No. 1 is used for driving rivets and for extra heavy chipping, No. 2 for heavy chipping, No. 3 for chipping, calking and beading flues and No. 4 for beading flues and light chipping. The regulator, however, permits even the heavier tools to be used for the lightest kind of work.

The Westinghouse Electric & Mfg. Company of Pittsburgh have secured a contract for furnishing the motor and car equipment for the West Jersey & Seashore Railroad Company of Philadelphia, who will operate a line of electric cars from Camden, N. J., to Atlantic City, 60 miles, and it is proposed to make the run in less than two hours.

THE WEEK.

The Atlantic Avenue Tunnel bill, passed by the New York State Legislature and signed a few days ago by Governor Roosevelt, gives to the Municipal Assembly of New York City the power to grant a franchise for a railway tunnel under the East River from Manhattan to Brooklyn for a term of 50 years, with the option of renewal for another 25 years. The plan as outlined contemplates the cutting of a tunnel beginning at some point in the vicinity of Broadway and Cortlandt street, Manhattan, extending beneath the East River to Flatbush avenue, Brooklyn, and thence by open cuts, tunnels and elevated structures to Jamaica, L. I., via Atlantic avenue, a distance of 12 miles. The tunnel under the East River will consist of two tubular conduits, thoroughly ventilated and lighted by electricity. It is estimated that the tunnel will cost about $6,000,000, and will require about two and a half years to build.

The United States Department of Justice has given an opinion to the Secretary of the Treasury on the question of taxation, under the War Revenue act, of what are known on the Stock Exchange as "puts" and "calls." It is held that "calls" are taxable, but that "puts" are not.

The English shipbuilding interest has experienced a decided falling off in business lately on account of the high price of metals. The only notable contracts booked on the Clyde since March are conditional orders for the construction of two first class cruisers for the British Government. The uncompleted orders held by the ship yards of the United Kingdom, however, guarantee work for a long time to come.

The pattern makers of Boston, Lynn, Cambridge and Hyde Park, Mass., have begun a strike for a nine hour working day.

The Peace Congress called by the Czar of Russia will meet at The Hague, Holland, to-day. The American and British delegates are working to get the question of international arbitration put first on the programme for consideration.

The Navy Department has rejected all the bids for an ordnance building at the League Island Navy Yard, Philadelphia, the lowest bid, $64,000, being $5500 in excess of the amount available. Since the appropriation was made the price of structural steel has advanced materially, so that it will probably be found impossible to keep within its limits.

A dispatch from Paris says that M. Ducretet, the engineer of the Eiffel Tower, has invented a system of wireless telegraphy by which he claims communication can be carried on between Paris and New York, provided poles 3000 feet high are erected. M. Ducretet is having poles erected at Nancy and Maxeville for the purpose of making tests of his system of ocean telegraphy in behalf of the French War Department.

The Birmingham (England) *Post* publishes what is claimed to be a trustworthy report from Berlin of the formation of a German iron and steel trust of considerable dimensions. This movement, it is said, is necessitated by late developments, as German iron founders feel that unless German power is more concentrated they will suffer severely from American competition.

A strike of the grain shovelers, freight handlers and other laborers at the docks of Buffalo, N. Y., has seriously crippled the business of that port. The Roman Catholic bishop of Buffalo is working to harmonize the dispute between the men and the contractors employed by the Lake Carriers' Association, and the State Board of Mediation and Arbitration is also taking a hand in the matter.

Two new lines of freight steamers between Norfolk, Va., and Europe will be put in operation this summer by the North American Transport Company and the Johnston Blue Line. The vessels will be run in connection with the various railways entering Norfolk, the Johnston Line putting on three boats monthly to Liverpool and one to Rotterdam, and the North American Company two boats monthly to Liverpool and one to Rotterdam. The establishment of these lines will increase the export facilities of Norfolk fourfold.

The Sayre bill, aimed against trade combinations, which has just passed the Michigan Legislature, is an even more sweeping measure than the anti-trust law recently adopted in Missouri. A trust under the terms of the bill includes "any combination of capital by two or more persons, firms, partnerships, corporations or associations to fix at any standard or figure whereby its prices to the public or consumers shall be in a measure controlled or established, any article intended for sale, barter, use or consumption" in the State of Michigan. The bill provides for violation of its terms a forfeiture of all rights in the State and the cancellation of all debts owed by Michigan debtors, as well as for a fine, which may be $5000, and for the imprisonment of any principal or agent of any corporation shown to be a trust. Moreover, any person who can show that his business has been injured by one of the proscribed organizations may sue to recover twice the amount of the damage sustained. As the bill was initiated by Governor Pingree it is safe to say that it will become a law. It will have to undergo the test of a consideration by the Supreme Court of the State, however, when put upon the statute books.

An electric railway is about to be constructed between Saint-Gervais-les-Bains and Chamounix, the famous Swiss village at the foot of Mont Blanc. The water power of the River Arve is to be utilized to generate the necessary electrical energy, which will be supplied from four power plants.

The Metropolitan Street Railway Company of New York City have placed three compressed air motor cars in service on their Twenty-third street line at night, with highly satisfactory results.

A seat in the New York Stock Exchange was sold a few days ago for the record breaking price of $40,000.

The payments made out of the United States Treasury up to the present time, in direct connection with the recent Spanish war, have reached about $270,000,000.

A great scarcity of workmen of all kinds, skilled and unskilled, exists among the iron and steel mills and factories of Youngstown, Ohio. There are no unemployed men in the city.

The Strache patent for hydrogen light is reported to have scored a great success in Austria. The invention has been tried with very satisfactory results at the Vienna General Hospital and other institutions, and it is freely predicted that the new hydrogen light will be able to compete effectively with both gas and electricity.

The New Phelps-Dodge Building and Its Tenants.

On Monday, May 1, the new Phelps-Dodge Building, at the northeast corner of Cliff and John streets, New York, was opened for business, and a number of leading metal and manufacturing companies moved in and took possession of their new quarters. The building, which is located in the heart of the metal district, is an imposing seven-story structure of Indiana limestone and light pressed brick. Its exterior decorations are particularly chaste and in good taste, and the building presents a rather striking comparison with its somewhat dingy looking neighbors. The main entrance hall at 99 John street and the stairs are finished in white Italian marble, and the flooring is of a handsome mosaic pattern. The wood work throughout is of quartered oak, and the entire structure is of fire proof construction, all the partitions being of non-combustible materials.

The first and second floors are occupied by the large tin plate and metal house of Phelps, Dodge & Co., who moved in from the adjoining building at 11 and 13 Cliff street. The firm, who were founded in 1823, have always remained within one block on Cliff street. The ground floor is used for the company's retail and shipping departments, and the entire second floor is occupied by the wholesale department and general offices. On the third floor is the office of the Estate of William E. Dodge, and the balance of the floor is taken up by the extensive and handsome office quarters of the Ansonia Brass & Copper Company.

Crocker Bros., metal merchants, lately at 32 Cliff street, have moved into commodious offices on the fourth floor of the building, and the rooms of the American Institute of Mining Engineers, formerly at 13 Burling slip, are located on the same floor. The Ansonia Clock Company have offices on the fifth floor. A. D. Gardiner & Brother, the Black Diamond Copper Mfg. Company, Robert Gentle and the Abendroth & Root Mfg. Company have offices on the sixth floor, where the American Tin Plate Company's Eastern agent, Frank Dickerson, has also taken possession of a handsome suite of offices on the Cliff street side. The Orford Copper Company, formerly of 37 Wall street, and Ledoux & Co., assayers to the New York Metal Exchange, are located on the seventh floor.

The Tube Consolidation—Elaborate reports have appeared in the press relative to the tube and pipe consolidation which has been in process of formation for some time past. In nearly every detail these reports are inaccurate. No official announcement concerning the details of the new company has yet been made, nor is any such expected in the next few days, since a number of matters are still unsettled.

The Iron Age.

New York, Thursday, May 18, 1899.

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The Growing Demand for Goods.

The next census may surprise some people who have not kept informed regarding current industrial and material progress by the favorable nature of the returns from certain sections not regarded in times past as particularly prosperous. Ten years ago the complaint of the heavy burden of mortgages borne by the Western farmer led Congress to include in the census schedules for 1890 a special inquiry bearing upon this subject. But before the returns could be printed the condition of the farmers had improved until interest in mortgages as a public question was practically at an end. Two decades ago the idea still prevailed in some Southern States that they could not maintain a larger population than they then had, for no thought was given to other means of supporting a population than by planting or farming. At that time the production of pig iron had hardly begun, whereas to day Birmingham is the third largest point of export of pig iron in the world, the development of which has led to an increase in both population and wealth, without working any diminution in the agricultural interest.

In whatever part of the country one may select for comparison may be found evidences of improvement in the conditions of the people, which has come from the modern diversification of industry. Apparently there is no limit to the number of different articles of comfort and convenience that may be produced and enjoyed by the people of such a country as this, through a proper division of the labor among specialists. This new era may be contrasted with those earlier days when the typical American citizen was first of all a farmer, after which he was something of a carpenter, blacksmith, wheelwright and cobbler, while the work of his household included spinning, weaving and tailoring. The farmer working also as a manufacturer could not produce the goods he needed so cheaply or of as good a quality as those now produced in mills and factories; by devoting his attention more directly to the soil and crops, he derives better returns from this source than under the old *régime*.

With the aid of improved farm implements and methods the labor of a constantly decreasing percentage of the population is able to produce all the foodstuffs required by the whole, together with a large surplus for export; likewise, a comparatively small number of factory workers, with the help of machinery, can weave more cloth in a season than all the farmers' wives in the country could have woven in the days of "homespun." Something like this is true of every other line of production, one result of which is that a certain proportion of the population has become available for supplying articles and commodities once known only as luxuries, or perhaps not at all, but which are now practically within everybody's reach, and are regarded as necessaries. A large class of workers has been developed also in the business of transportation, under a system whereby a State may be crossed with more comfort and at less cost than in traveling from one township to another in earlier days.

As fast as improvements are made in any branch of industry whereby workers are released from employment, new wants seem to be developed, so that the total opportunity for employment becomes greater rather than less as a result of modern invention. It rests largely with the individual, of course, whether his wants shall be kept below the extent of his productiveness, in whatever branch, but as this is the case oftener than otherwise, the constant development of new industrial channels tends to increase the national wealth. No census returns are necessary to impress the minds of people who can remember when there were no railways or other modern enterprises west of the Mississippi, but who now find there populous towns, connected by great railway systems that are operated at a profit, the whole being supported by intelligent and progressive agricultural communities that are growing richer rather than poorer. A less inventive or less ingenious people than our own, or one more attached to precedent, might have made progress more slowly; it concerns us, however, to note that the people have so adapted themselves to circumstances that each worker seems employed on what he is best suited for, that there is a constant increase in production, and yet that little is heard of overproduction. This is the explanation of the growth in so many lines of production in America, which has become the best consuming market in the world.

These conditions have been mentioned because, to a certain extent, they may be expected to be repeated elsewhere, and hence to swell the demand for the products of the manufactories of America and Europe. The tendency everywhere must be toward the standards attained by the country which has made the greatest progress; the world has become so small that every nation comes into contact with every other, and none is allowed to stand still. It is not necessary that the work of progress in any country shall be begun by its own people. In our own country has been seen the spectacle of long lines of railway projected through a wilderness or bleak prairies, followed by the settlement of the land, the laying out of farms, and the building of towns. In Brazil to-day millions of pounds sterling are invested in steamship lines on the Amazon, engaged in traffic between the natives and outside traders who have forced their way into the country, and, by creating new demands on the part of the natives, have opened new markets for the sale of goods which until recently were unknown to the latter. Similarly Belgian capital has built a railway around the cataracts in the Congo, in Africa, since which time there has been a steady increase in trade in that section, due to outside influences. Then the British have been opening a railway from the East African coast to Uganda, through a country as well fitted for cultivation as any of our own Western States. They are also building a railway up the valley of the Nile, which may prove a step in rendering again populous and wealthy a country that once led the world in civilization. There are other railway enterprises going forward in Africa, and still others in India and South America; the great Russian road to the Pacific we have all heard about, and now it appears that some of the Chinese railway concessions are likely soon to be developed.

In every case the opening of these lines of transportation involves the possibility of some such devel-

opment as attended the building of our own Pacific lines, even if on a smaller scale. To a certain extent, too, hand work in the Oriental countries is being replaced by machinery, as we have seen in this country, and in time a much more widely diversified industrial system will result, but it will only mean more work for more people, not only in the countries most directly concerned, but also in those countries which, like our own, have gained a position as industrial leaders from which they cannot soon be dislodged.

Consolidation and Fixed Charges.

The point has been raised that the heavy capitalization of the principal consolidations in the iron trade involves great financial responsibilities to these producers. It is argued that the fixed charges in the way of interest on bonds and dividends on preferred stock are an addition to cost, which gives rival producers in other sections opportunities for successful competition. It may be of interest to go over some of the published figures to ascertain approximately what on the face of the returns this means per ton of final product.

Beginning with the Federal Steel Company we find that this concern have outstanding $27,359,000 of 5 per cent. bonds and $2,600,000 of 6 per cent. bonds, which call for $1,523,450 interest annually. There is outstanding $53,253,500 of 6 per cent. preferred stock, which is not cumulative, however. With a total annual output of about 1,800,000 tons of finished and partly finished material this would present a charge of, say, $2.50 per ton. Since the company must depend largely upon outsiders for their coke supply, they must pay a profit in that direction, and they must also pay royalties on a considerable part of their own product. On the other hand, there is an income of some importance in the way of subsidies.

The National Steel Company must meet interest payments on $2,561,000 of bonds, and provide for 7 per cent. on $27,000,000 of preferred cumulative stock, a total of $2,043,660 of annual charges. The company have a rated capacity of about 1,800,000 tons of steel, so that this would represent a charge of about $1.25 per ton. This looks low, but it must be considered that the product is the relatively crude form of billets and sheet bars, and that the ore supply and the coke supply are only partly covered. On the other hand, the close relation between the company and the finishing mills of the American Tin Plate Company and the American Steel Hoop Company assures an outlet for upward of 1,000,000 tons of product at remunerative rates. It is understood that the company have long time contracts on a low basis for Rockefeller ores, and have a sixth interest in the Oliver Iron Mining Company's output of iron ore.

The American Steel & Wire Company have dividends to pay on $38,150,000 of preferred stock and on about $700,000 of bonds, making a fixed charge of about $2,700,000 annually, or, say, $2.75 per ton on about 1,000,000 tons of finished products. While controlling only a moderate percentage of raw materials, and dependent largely upon others for steel, the wire company market, besides large lines of staple goods, very important amounts in value of high priced specialties.

The American Tin Plate Company have no bonds outstanding, but are expected to earn $1,260,000 annually on their preferred stock. This is equivalent to $3.25 per ton of tin plate marketed, their supply of steel being assured by the National Steel Company. Another property similarly situated, although it possesses an output of pig iron with a partial supply of coke, is the American Steel Hoop Company. Their preferred stock calls for $980,000 annually, or on a product of 600,000 tons of finished material, say, $1.65 per ton.

A direct comparison of these different figures is not possible, since the conditions vary very widely. For a concern controlling the whole line of raw materials and the means of transportation the average tonnage rate would figure out very considerably higher. Still the rough data submitted show that the fixed charges are far from being the weight upon output which many in the trade believe them to be.

The Increase of Gold and the Advance of Prices

The great addition to the stock of gold which California and Australia made half a century ago was followed by an advance of prices which Professor Jevons and Professor Cairns had no doubt was its result. There has been for a dozen years a great increase in the supply of gold, and there is now an advance in prices. Is this advance due to the supply of gold?

If there be any connection it is not so close as it was 40 and 50 years ago. Sauerbeck's price tables show a marked decline of prices from 1847 to 1849. Then there was an advance from an index figure of 74 to an index figure of 105 in 1857, when there was a panic and a decline of prices followed by another upward movement, and 105 was again reached in 1864. There was another decline to some extent, and the high water mark of 111 was reached in 1873, since which time there has been a pretty constant decline. This was accelerated by financial troubles in Europe growing out of the Baring failure in 1890 and by our panic in 1893, and low water mark was reached in Europe and America in 1896, since which time there has been a moderate recovery of prices in both hemispheres.

The first great addition to our supplies of gold following the discoveries in California and Australia began with the new finds in South Africa in 1887, though the present output of gold is due quite as much to the increased output of the old fields as to this new source. In its extent the increase has put California and Australia to the blush. In the ten years 1851-1860 the total production of gold was $1,332,981,000. In the ten years beginning with 1889, when the increase began to be marked, the production was $1,789,372,426. And yet the decline of prices continued till 1896. This casts some doubt upon the supply of gold as the cause of the increase of prices. The force of the comparison is not to be broken by reference to an alleged "crime of 1873." Mr. Preston, recently Director of the Mint, and the highest authority on this subject, computed that the silver money in the world in 1873 was $1,816,000,000, and in 1894 $4,000,000,000. In the last four years the coinage, deducting recoinage, has been $492,000,000. In the same period Mr. Preston computed that the gold money in the world had increased from a little more than $3,000,000,000 to $4,250,000,000, and in the past four years the gold coinage, deducting recoinage, has been $894,000,000. It must be remembered that gold and silver coin last a long time. The food produced in one year has for the most part disappeared before the harvest of the next year, but the gold and silver once recovered from the earth remain in use very long periods; the waste is a very minute fraction.

It would be rash to say that the increased produc-

tion of gold had had no effect upon prices, but as the advance in prices began less than three years ago and on a general average has been very moderate it may be said with confidence that if it has had any effect it has been a subordinate one. It is apparent that whatever effect the supply of gold has had upon prices must have affected all prices alike; the variations must be attributed to causes not common to all articles, but peculiar to certain articles. If we take Sauerbeck's prices we observe that in 1898 the advance of two years had only carried prices back to a point between the prices of 1893 and 1894, and they were still below those of many years preceding 1893. If we turn to *Bradstreet's* tables we get the same result. Based upon a different datum line from Sauerbeck's they decline from about 106 in the latter part of 1890 to less than 65 for the whole of 1896, and had not quite reached 79 in the first quarter of this year. This is substantially less than the averages for 1892 and 1893. Evidently the influence common to all prices —and a change in the value of money must be such an influence—is a very moderate one.

Individual articles show great changes, but changes in the prices of single articles or groups of articles must be attributed to influences affecting those articles and not others. No one will pretend now that the changes of the past three or four years in the price of wheat were due to changes in the supply of money; it is too obvious that they are due to scanty or abundant crops. The great increase in the prices of iron and steel is plainly due to the unusual demand for them. If the increased price were due to the fact that money, being in greater supply, had lost some of its purchasing power, the increased price should have occurred with a stationary demand; it has, however, closely followed the increased demand. That a greater supply of gold accounts for a larger consumption of iron is a proposition that has not much presumption in its favor and would be very difficult to prove. The small change that has occurred in the price of animal products often increases, and never considerably decreases, the moderate reduction in agricultural products as a whole, and the great reductions in transportation and mechanical and mineral products suggest as the chief cause of the decline the improvement in processes and implements. After every period of depression there is a revival, and with that comes an increased demand which forces up prices, and this seems to be the most important part of the explanation of the advance in prices that has been going on for a couple of years, but which has been so slow, taking all commodities together, that according to both Sauerbeck's and *Bradstreet's* prices are not yet where they were in 1893.

The American Steel Hoop Company.

Among the recent large consolidations in the iron trade none was so quickly organized as the American Steel Hoop Company, and least is known of it with the general public. Yet its recent history illustrates in a striking degree what organization and management are capable of effecting. The company were formed to bring under one control the manufacture of hoops, bands and cotton ties, but incidentally their mills produce large quantities of skelp, bars and other shapes. The company started with a cash working capital of $3,000,000, and no bonded indebtedness, with the exception of $50,000 on the Lindsey & McCutcheon plant, for which reserve was made in the purchase price. When the options were obtained the mills were taken over as going concerns, the consolidated company assuming all contracts for purchases of raw material and sales of product. Early in the movement and before the rise in prices the different companies withdrew from the market, so that the successor is not loaded down with low priced contracts. The purchases of low priced material leaves a profit on old orders of about $2.50 per ton. Directly after the formation of the American Steel Hoop Company contracts were closed for steel with the Carnegie Steel Company and with the National Steel Company, an allied interest, for all the raw material to run the mills up to February 1, 1900. Since these purchases were made an advance has taken place on steel of $3 to $4 per ton. Large purchases of Southern mill iron for the puddling departments were made at prices considerably below those ruling to-day.

One provision in the options with the constituent companies has proved a satisfactory feature. It was arranged that the material in course of manufacture should be taken over at $1 above mill cost. The subsequent advance in materials did not, therefore, adversely affect the company, as does the usual method of such organizations which take over material at market prices at the time of final transfer. Over $1,250,000 of material was taken over under these conditions based on an average of $15 to $15.50 for billets.

In the pig iron department the principal furnace group had made no sales beyond July 1, while the ore supply was contracted for at the prevailing low prices of the season to July of next year. The coke supply is obtained to the extent of one-half from the ovens of the company, while the balance was secured to the end of the current year at about $1.35 at oven. Since the company have been formed about $90,000 of Bessemer pig iron have been sold at an average profit of $5.50 per ton, and large sales of finished product have been effected at a very handsome profit.

One of the principal channels of effective economy in handling the mills by common management over the old competitive system is the distribution of orders to the individual plants in such a manner as to secure minimum cost. Under the old methods every concern took of the orders coming into the market their share of the 80 odd sizes and shapes which are standard products, a considerable portion of the tonnage being distributed down to mixed carloads. Every one familiar with rolling mill work will appreciate what that means in the way of changing rolls, carrying and cutting up stock, reducing output and enhancing cost. Under central management the orders are distributed so that the plain straight forward work goes to those mills, like the Union continuous mill, which can handle to best advantage orders of this character. It is estimated by conservative mill men that the economies thus secured will be equal to at least $1 per ton on the aggregate tonnage of the company, say 600,000 to 700,000 per annum in ordinary times.

In addition to these manufacturing economies there has been a considerable saving in freights, and the aggregate cost of the selling agencies, which was very heavy, has been practically eliminated.

Since the dividends on preferred stock are $980,000 per annum it is quite evident that for this year, at least, the furnace properties will more than pay the dividend on this preferred stock for the corresponding period, since the furnaces are producing at the rate of 700 tons daily and have all the raw materials bought at 1899 prices running up to July 1, 1900. This will leave all the other profit made from the operation of the finishing mills to be applied to dividends on the common stock and to surplus account.

Judging from the work decided upon, a part of this surplus will be devoted to the improvement of plant and appliances. The first step is the remodeling of the Isabella Furnace plant. The blowing power, which has been inadequate, is to be increased. Additional hot blast stoves are to be provided, and, as opportunity offers, the stacks are to be raised and modern automatic charging appliances are to be supplied. In this manner the capacity will be practically doubled and the cost materially lowered.

It is probable that when the pressure of current work on the mills permits it, plans for concentrating the plants will be carried out, with the aim to concentrate in those localities most favorable for economic production the effective equipment available.

A suit in equity has been instituted by the Bethlehem Iron Company of Bethlehem, Pa., against the Corliss Engine Company for an injunction to prevent the transfer of the latter by the Hoadley syndicate at present in control, pending the presentation by the Bethlehem Company of a claim for $8000. A preliminary injunction has been granted and a hearing will be held at an early date.

At a conference held in Pittsburgh last week between James H. Nutt, representing the Manufacturers' Association of Youngstown, Ohio, and officials of the Amalgamated Association it was found that the average price of common iron bars shipped from the mills in the Mahoning Valley for March and April showed that wages for May and June will be on a 1.10 cent basis, which carries with it an advance of 25 cents in puddling and an advance in finishing mills of about 2 per cent.

The Old Type of Monitor.

BY WM. H. WILEY, NEW YORK.

(With Supplement.)

At the last meeting of the Society of Naval Architects and Marine Engineers, held at New York, December, 1898, one of the speakers commended the monitors for fighting purposes, and made the remark that he would rather have ships of the type of the "Puritan" than any of the present style of battle ships.

A little later the ubiquitous reporter interviewed Admiral Bunce on the subject, and this was the substance of his remarks:

"I have commanded six monitors, and I deplore the present tendency to discredit the type. I haven't seen the official report on monitors, made as the result of the naval operations in the war with Spain, but I understand that it is decidedly unfavorable. Now, I have talked with the captains who commanded in our squadrons, and I learn that there is far from being unanimity in disparagement of the monitor. The captain of one of the monitors which were taken to Porto Rico by Rear-Admiral Sampson told me that he was steaming 9½ knots when he was taken in tow by one of the other vessels. It wasn't because he couldn't steam, but simply to save his coal, which was limited—a deficiency by no means inevitable in the type. I was also told that when on the way the vessels of the squadron were signaled from the flagship to state what speed they could easily maintain, the monitors replied '9 knots,' the battle ship 'Indiana' '6½.' No, there is nothing the matter with the monitor. They say that it is slow, but there is no reason under the sun why it should not be as fast, or nearly as fast, as the fastest battle ship. They say that it is uncomfortable to live in, and that is true of the monitor as now constructed, but it can be made as comfortable, or nearly so, as any other war ship. They say that as a gun platform the monitor is unstable, but that again is only a matter of size and construction, not to say a question of opinion. They say that the coaling capacity of the monitor is very limited, but it is not necessarily so. Build the monitor on ampler lines, and almost every objection urged against it will disappear. Take away most of the high freeboard of one of our first-class battle ships and all the superstructure between the great turrets, and you have a monitor relieved of ponderous weight, vastly cheaper, and, ship to ship, equally powerful, if not more so."

Admiral Bunce subsequent to the above publication called on the writer, and as they had known each other at Charleston in 1863, this subject of monitors was discussed. Bunce had been in command of the "Catskill," shown in Fig. 1. His view was that the monitor had the fighting qualities of a battle ship without the detriment of a larger exposure of surface to the enemy, and hence could engage at close quarters under more favorable conditions. He did not share the great apprehensions expressed as to her seagoing qualities, believing if the hull was made larger and more coal capacity given these objections would disappear to a large extent. Now, Admiral Bunce took the "Monadnock" from New York to San Francisco, and therefore can speak with authority on what the monitor could be made to do as a seagoing boat.

As there is evidently renewed interest in this type of war ship, although it is popularly considered out of date and obsolete, it occurred to the writer that perhaps some photographs taken recently of the "Catskill," which was in her time one of our best fighting monitors, might be of interest. These are presented on the accompanying supplement. Many of the scars of battle are still to be seen on the turret. The writer witnessed the fighting in front of Charleston, but was an army officer, hence does not presume to speak as an expert nor as one of the navy. On one memorable occasion eight monitors and the "Ironsides" bombarded Fort Moultrie, and later Fort Sumter, approaching so near to these forts that the army batteries had to cease firing, and the writer, being on duty as an artillery officer in Fort Wagner, that day witnessed the entire fight from a short distance.

Admiral Dahlgren, then in command of the fleet, went on board the "Catskill" and hoisted his flag, which at once drew the enemy's fire, and he states that this monitor was struck 60 times in the engagement. As to the effect of this short range fire it may be said when the 15-inch Dahlgren gun was fired it seemed as though tons of masonry fell from Fort Sumter's wall, and yet in those days the service charge was limited to 18 pounds of powder of the old fashioned type. Recently these same guns have been fired with a service of 70 pounds of modern powder and their efficiency was, of course, greatly increased. One naturally wonders what would have been the effect in 1863 had the charge and the powder been that used in the recent tests. As the photographs for the most part tell their own story, no attempt at description will be made. The pictures of the interiors of the monitors are believed to be the only flashlight pictures ever taken of these subjects, and for their use the writer is indebted to Eric B. Dahlgren, son of Admiral Dahlgren. There were other views taken, but it is thought these give a fair idea of the monitor. Naturally the photographs taken below decks and in the turret were very difficult to obtain, and great credit is given to Captain Porter of the Massachusetts Naval Reserve for such successful representations. The writer hopes these photographs, if they do nothing more, will call to the mind of the present generation what sort of material the heroic Dahlgren used in front of Charleston in 1863, and what was used by our other naval heroes all through the later years of the war.

It is hoped, however, that they may raise the question as to whether or not this type of fighting ship is to be relegated to obscurity, and the furthermore serious one: Could not some modifications be made in the monitor type which would fit them for other uses than those of mere harbor defense, notwithstanding their admitted peculiar adaptability for this service? The cost of the monitor type of ship is so very much less than that of a battle ship that it would seem as if there was a fair field for investigation as to what might be the effect of certain modifications in a monitor to meet the requirements of modern naval warfare; but this, of course, is a question on which the views of a layman are of no value unless as suggestions of material for experts to work upon.

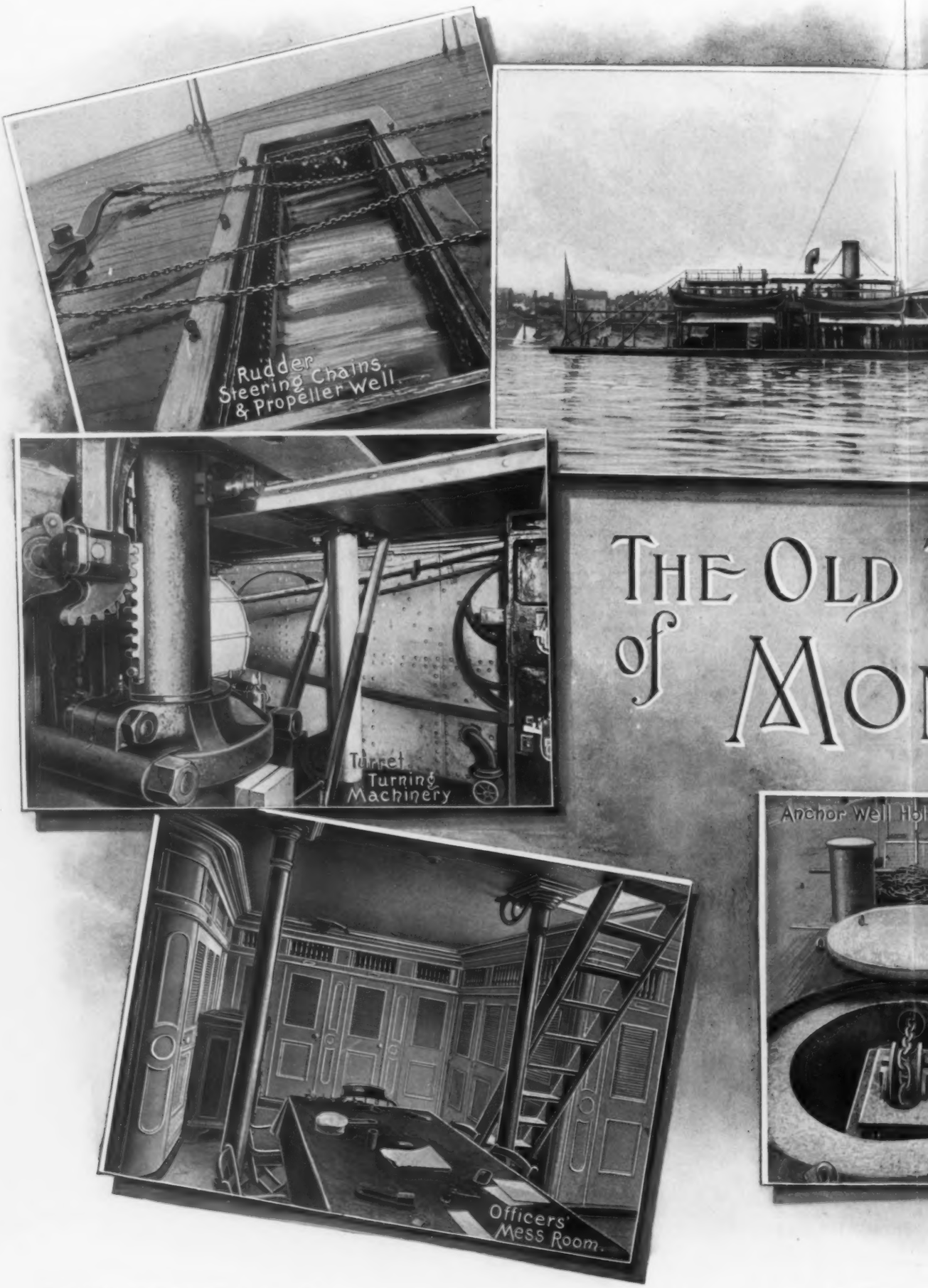
Engines of the "Monitor."

The engines of the "Monitor" were designed by John Ericsson according to his patent, and are styled "vibrating lever engines." The two cylinders are horizontal, both in one casting, and have one bottom in common which is bolted in at its center. The cylinders lie athwartship, and are wholly above the screw shaft. They are bolted to a strong foundation plate, which likewise extends athwartship and above the screw shaft. This foundation plate, at each outboard side, is formed into the pillow blocks of the vibrating lever shafts. The after side of it, at the center, is also formed into the pillow block for the end journal of the screw shaft.

The valve chests are upon the forward side of the cylinders, and contain a balanced slide and an independent slide cut off valve, each worked by its own eccentric keyed upon a small shaft revolved by the screw shaft, and lying in the prolongation of its axis. The motion is reversed by turning the small shaft with its eccentrics by hand.

The piston has a half trunk—that is, a trunk upon its outboard end in place of a piston rod—and is fitted with a pin at the center. From the pin at the center of the piston a connecting link extends within the half trunk to an arm forged on the vibrating lever shaft.

The vibrating lever shaft, one to each cylinder, extends in the fore and aft direction of the vessel, and is supported in two pillow blocks on the foundation plate. An arm opposite the center of the cylinder and forged on the shaft receives, by means of the connecting link, the movement of the piston. Another arm, but of greater length, keyed upon the shaft beyond the after side of the cylin-


Rudder
Steering Chains
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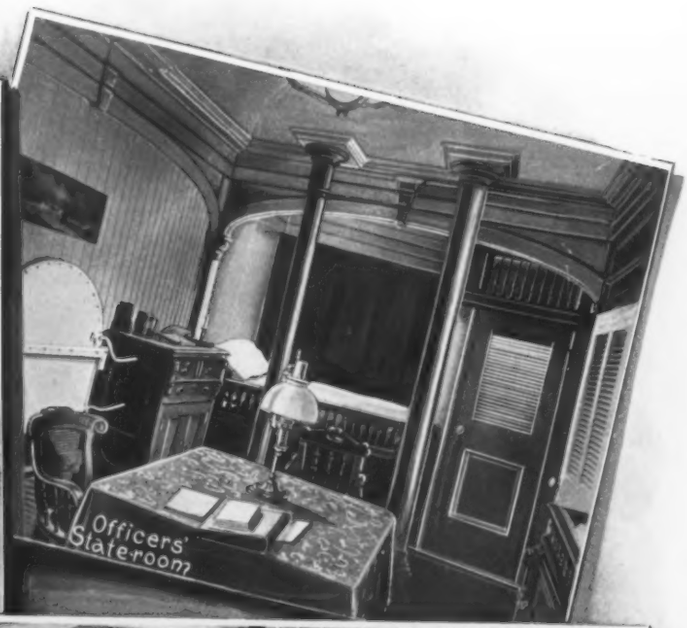
U.S. Monitor Catskill.



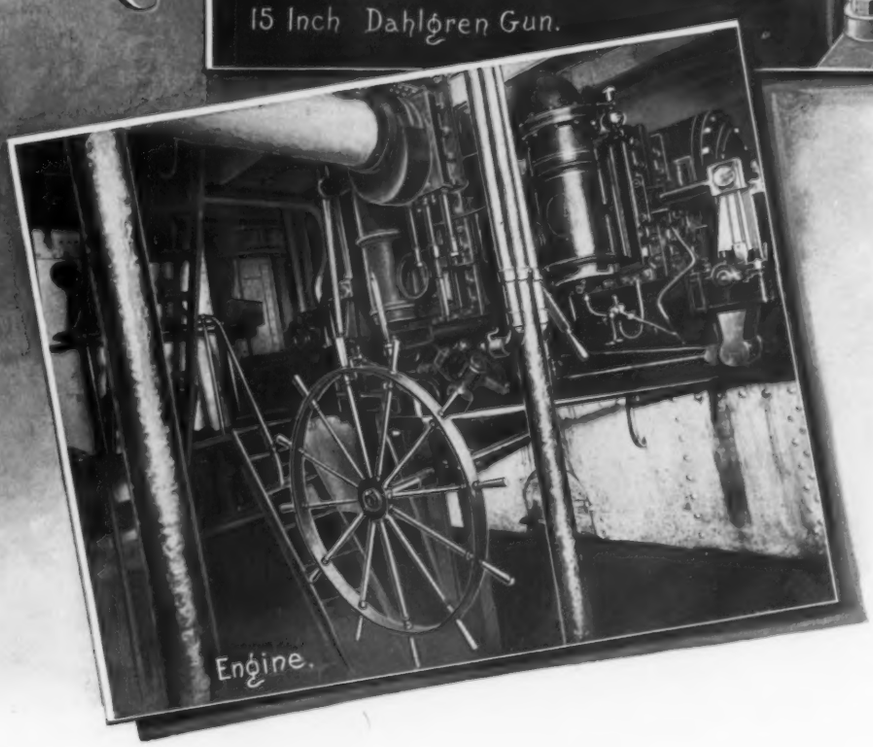
Officers' State-room

D TYPE

ONITOR

15 Inch Dahlgren Gun.

well Hole



Engine.

ders, transmits by means of an ordinary connecting rod the movement to the crank pin.

There is but one crank and crank pin for both engines. The crank is keyed on the forward end of the screw shaft, and revolves within an opening in the bed plate, which latter is extended sufficiently abaft the cylinders for this purpose and to carry the pillow block of the end journal of the shaft.

There is but one condenser and air pump for both engines; the condenser is of the common jet kind; the air pump is horizontal and double acting, and is worked from an arm on one of the vibrating lever shafts prolonged. The casting containing the condenser, air pump, channel ways, hot well, &c., is bolted independently of the engine to the cross keelsons of the vessel, and is situated abaft the foundation plate, so that the crank revolves between it and the cylinders.

The feed and bilge pumps are horizontal and single acting; they are bolted one on each side of the casting containing the condenser and air pump, and are worked from the air pump crosshead.

The following are the principal dimensions of the most important parts—namely:

Diameter of the cylinder	40	inches.
Diameter of the half trunk	13.5	inches.
Average area of the piston for both strokes of one cylinder, exclusive of half trunk	1185.07	sq. in.
Stroke of the piston	22	inches.
Area of steam port	4 x 16	inches.
Area of exhaust	5 x 16	inches.
Diameter of air pump	16	inches
Stroke of air pump piston	18	inches.
Diameter of feed and of bilge pumps	5	inches.
Stroke of plunger of feed and bilge pumps	18	inches.
Diameter of main journal of screw shaft	9	inches.
Diameter of crank pin	5⅛	inches.
Diameter of main connecting rod in neck at crank pin end	3¾	inches.
Diameter of main connecting rod in neck at vibrating lever shaft end	3⅛	inches.
Length of main connecting rod between centers	53¾	inches.
Length of crank between centers	20⅛	inches.

OBITUARY.

DAVID L. BARTLETT.

David L. Bartlett, senior member of the iron foundry firm of Bartlett, Hayward & Co., Baltimore, Md., and a leading citizen of that city, died on May 11 from pneumonia, aged 83 years. He was born in Hadley, Mass., and when quite a young man entered the iron business at Hartford, Conn. In 1844 he removed to Baltimore and started a foundry. In 1850 the present foundry at the corner of Scott and Pratt streets was established in partnership with J. H. Hayward, under the firm name of Hayward, Bartlett & Co. This firm have continued, with slight changes, the title now being Bartlett, Hayward & Co. They conduct an extensive and successful business, employing an average of 500 skilled workmen and filling a large number of important contracts. Mr. Bartlett was president of the Ryan & McDonald Mfg. Company and president, officer or director in a number of financial, business and public institutions of Baltimore. He was a vice-president of the National Manufacturers' Association of America and a member of the Merchants and Manufacturers' Association of Baltimore. His son, Edward L. Bartlett, is one of the present partners of the firm of Bartlett, Hayward & Co.

WILLIAM D. SOUTHARD.

William Depew Southard, one of the foremost stove manufacturers of the country, died at his home at Peekskill, N. Y., on May 15, from Bright's disease. Mr. Southard was born at Peekskill on July 18, 1840, and on the death of his father succeeded to the control of the People's Stove Works, becoming senior member of the firm of Southard, Robertson & Co. He filled many local offices of responsibility and honor and was one of the most public spirited and esteemed citizens of Peekskill.

JAMES P. CRAWFORD.

James P. Crawford, president of the Terre Haute Iron & Steel Company and secretary of the Wabash Iron Company of Terre Haute, Ind., died on May 12 at the Plaza Hotel, New York City, where he had been staying for several months under treatment for a bronchial trouble. He was born in New Castle, Pa., 44 years ago.

WILLIAM H. CARPENTER.

William H. Carpenter died suddenly on May 13 at the home of his son in Brooklyn, N. Y., at the age of 74 years. He was born in New York City and was for many years engaged in the manufacture of gold pencil cases, but later became identified with his son, the late J. H. Carpenter, in the Carpenter Steel Works of Reading, Pa.

PERSONAL.

Ferdinand W. Peck has appointed Willard Adelbert Smith director of transportation to the United States Commission at the Paris Exposition of 1900. Mr. Smith is well known as the edtior of the *Railway Review*, was chief of the Department of Transportation of the Columbian Exhibition, collected the exhibits in Europe for the Field Columbian Museum at Chicago and is now president of the Cloud Steel Truck Company.

Will J. Fogarty, formerly with the Stilwell-Bierce & Smith-Vaile Company, has been appointed general superintendent of the Magnetite Foundry Company, St. Louis, Mo.

J. C. Beckfield of Allegheny, Pa., has returned from Europe, where he went in the interests of the Beckfield water heater, which he controls. Mr. Beckfield reports having made a large number of sales of this heater.

J. F. Welborn has been appointed general agent of the Colorado Fuel & Iron Company in charge of the New York office, 71 Broadway. He has also been appointed assistant secretary and assistant treasurer.

F. E. Drake, United States Director of Machinery and Electricity to the Paris Exposition of 1900, who accompanied Commissioner-General Peck to Paris, has returned to New York.

Daniel Fox, formerly of Best, Fox & Co. of Pittsburgh, brass founders, pipe fitters and machinists, sails this week for his old home in Ireland. Mr. Fox will be absent several months, and on his return will again identify himself with the manufacturing interests of Pittsburgh.

John J. Williams of the Brown, Bonnell Iron Company, at Youngstown, Ohio, is announced as a candidate for the Republican nomination for State Senator from the Mahoning-Trumbull district.

W. P. Snyder, the well-known iron and steel dealer of Pittsburgh, who has been recuperating at Atlantic City, N. J., for a month or more, is expected back in Pittsburgh this week.

Howard Pedrick, for some time manager of the works of the Pedrick & Ayer Company, Philadelphia, has resigned, and will leave on May 24 for Dutch Guiana, where he will superintend the installation of a large consignment of machinery for working the placer mines in the Marowwign district, for the Marowwign Company.

Andrew Carnegie has offered to donate $250,000 to the University of Birmingham, England, with the proviso that the Scientific School of the University be made the principal department of the institution. The gift has been accepted by the trustees of the university on the terms mentioned.

John A. Walker, vice-president of the Joseph Dixon Crucible Company, Jersey City, N. J., sails for Europe May 23, on the steamer "Kaiser Friedrich."

H. C. Brill has been appointed general superintendent of the Pennsylvania Bolt & Nut Works, Lebanon, Pa.

Information Wanted.—Who produces the Goodrich model treadle machines?

A correspondent wishes to know if there is a flux or acid made that will solder a steel tube into a cast iron socket, the tube being inserted about ½ inch.

A correspondent asks for the address of manufacturers of wire weaving machinery suitable for mattress making.

The Atlantic Brass Company, incorporated last week at Trenton, N. J., with a capital of $1,000 000, have been formed for the manufacture of brass journals for car axles. The company control patents on processes invented by Wm. B. Smith and others. Austin Corbin of the Corbin Banking Company of New York is president of the new concern and the directors in addition to Mr. Corbin are Wm. A. Russell of the International Paper Company of Boston and J. Wheaton, also of that city; Robert S. Green of Elizabeth, N. J., and Wm. B. Smith of New York.

The London *Times*, on the authority of its Cairo correspondent, says that General Lord Kitchener intends to open the Soudan to all trades, on the completion of the railroad to Khartoum, and foreign goods will be admitted free of duty.

The American Foundrymen's Association.

The third annual convention of the American Foundrymen's Association, held in Pittsburgh this week, fulfilled expectations. The attendance was large, great interest was taken in the procedings, the papers presented were exceptionally able, the local committee provided lavish entertainment, and in every respect the occasion was one which will live long in the memories of those who were able to be present. The opening session began at 10 a. m., on Tuesday in the club room of the Monongahela House.

William Yagle, president of the Pittsburgh Foundrymen's Association, welcomed the members and visitors to Pittsburgh and introduced Mayor W. J. Diehl, who made an address of welcome, in which he referred to the fact that the first foundry was established in Pittsburgh in 1802, and that the first stove foundry followed in 1830.

Clarence Burleigh, present District Attorney of Allegheny County, and a former pattern maker, welcomed the visitors in behalf of the local foundrymen, making an eloquent address in which he depicted the glories of the manufacturing industries of the city. The pre-eminence now attained by Pittsburgh products throughout the world was set forth in glowing language.

John Bindley, president of the Pittsburgh Chamber of Commerce, followed in an equally eloquent vein on

"Pittsburgh as a Manufacturing Center."

Pittsburgh is much greater commercially than the statistics of the enumeration of her inhabitants would indicate. The census of 1890 placed within her municipal border 239,000 people, but, unfortunately for our statistical record, our border lines are very circumscribed; for instance, Allegheny County (of which Pittsburgh is the capital) contains practically five cities, which are in fact as much integral parts of our city as those located within its boundary lines, and owing to a sentiment which seems false these conditions will not be changed prior to the taking of the 1900 census, and we may retain the present (viz., thirteenth) place in list of cities, instead of attaining our proper position, the fourth city in the Union. According to the census of 1890, taking a circumference of 60 miles, with Pittsburgh as the center, we had a larger population than any city west of the Allegheny Mountains; within the same prescribed limits, astounding as it may appear, we had almost 100,000 more than Chicago, 500,000 more than Cincinnati, and 700,000 more than St. Louis. This will partially explain and account for our financial and commercial position in the business world. Located in the center of almost inexhaustible beds of the finest bituminous coal, settled by a people with a blending which makes them progressive, aggressive and unyielding in their determination, with an irresistible activity that has developed and created this wonderful and unique city into the capital of the greatest manufacturing empire in the world. The shipping facilities are of the best, with railroads diverging in every direction, with natural waterways, improved and improving, giving us miles and miles of river frontage and harbor, eventually we will have a boating stage of water continuously during navigable season from the headwaters of the Monongahela to the Gulf of Mexico, and thence to every seaport. These shipping facilities are carefully guarded with jealous eye, as Pittsburghers fully recognize the value of the economies of cheap transportation, and it is ever the aim of those who foster the interest of our city to constantly demand better, greater and ever improving facilities.

To-day the world's supremacy in the metallurgical art is conceded to us. It has been wrested from Great Britain. The world is our market, and we stand almost without a rival, as our products are sent to every part of the civilized globe, and our name and fame will everywhere become as familiar as household words.

Our city is unique in its creation of wealth. Here the raw material is taken, and by the various processes developed until finally its value has been greatly multiplied, whereas in many manufacturing localities the cost of raw material is a very large per cent. of the article produced.

Financially we have a banking capital (including surplus) of $40,000,000, and deposits of about $140,000,000. In clearing house exchanges we to-day are the fifth city in the Union, being exceeded only by New York, Boston, Chicago and Philadelphia.

As manufacturers and producers we are pre-eminent in the following, outranking in production any city in the world: Steel and iron, plate glass, table glassware, window glass, tin plate, steel and wrought iron pipe, coal and coke, air brakes, electrical machinery, pickles and condiments, oil and gas.

Our annual product of pig iron is over 3,000,000 gross tons, or 27 per cent. of the total production of the United States. Our production of Bessemer steel is over 2,000,000 tons, or 37 per cent. of the whole. Of open hearth steel our output is 1,500,000 tons, or 65 per cent. of the whole. The total production of Bessemer and open hearth steel for the United States for the year of 1898 was 8,829,500 tons, of which Pittsburgh produced 3,500,000 tons, or 40 per cent. of the whole. Of crucible steel we produced 60 per cent. of the whole; of structural steel, 63 per cent.; of plates and sheets, 33 per cent., and of wire and nails, 30 per cent. In the steel pipe and tube industry we lead the universe. Of coke we produce 8,500,000 tons, and our Connellsville coke is famous beyond compare. Our coal production in round numbers was 17,000,000 tons. The Pittsburgh district produces of table glassware 63,000 tons annually; of window glass 40 per cent. of the total production of the United States, and of plate glass 75 per cent. of the whole. One firm has capacity to produce 5,000,000 dozen tumblers annually. In all these branches we have the greatest plants in existence, colossal in extent.

Oil and natural gas have been the source of great wealth to our community. The product of oil, of which Pittsburgh is the territorial and operating center, was last year over 35,000,000 barrels. The estimated daily consumption of natural gas in the United States is 200,000,000 feet and Allegheny County consumes many times more than any other county or locality.

The name of Westinghouse in connection with the air brakes and electrical appliances is indissolubly associated with Pittsburgh, and has added fame to our name the world over. Thus far I have only spoken of the tremendously great products of this locality, but in other lines of manufacture we are large in comparison with other cities. The goods produced here are varied, and of great variety and extent. It would require volumes to tell their interesting story. We produce largely locomotives, lamp chimneys, aluminum, bottles, cigars, corks, whisky, and have immense baking establishments. We also have the greatest of steel car works, with a capacity of 35 cars per day, and other industrial establishments too numerous to mention. In every line our mercantile establishments are in keeping with this progressive age, and fully representative of our city, comparing favorably with those to be found elsewhere.

In tonnage we are the greatest creators of any city in the world. We have no peers. In 1898 our tonnage amounted to 50,000,000 tons, and this year promises to reach the enormous total of 60,000,000 tons, our car service was 2,000,000 cars, of 20 tons capacity each, placing us beyond all rivals. To this must be added our river tonnage. It is said that the tonnage of one of our immense establishments is greater than the whole combined tonnage of the Grand Trunk Railway of Canada, and much greater than the entire cotton crop of the South. Comparisons of this kind will leave their impressions of the vastness and extent of the business and commercial greatness of Pittsburgh.

C. D. Bell, president of the American Foundrymen's Association, responded with hearty thanks for the cordial greetings which had been extended to the association. He looked forward to the sessions of the convention with great interest, believing that every one would find them profitable. Referring to the condition of trade he stated that the foundrymen had not all been benefited by the advances in price. Many had made contracts for their products based on the cost of pig iron previous to the advances and in consequence had suffered loss. He hoped that the future would have better things in store.

Dr. R. G. G. Moldenke of Pittsburgh read a greeting sent from Berlin by the foundrymen of Germany, admiring the energetic and effective manner in which science and practice have been made to go hand in hand in the development of the industry and expecting to hear of still further achievements from the free exchange of thought on foundry methods. The convention directed Dr. Moldenke to make a suitable reply.

Secretary John A. Penton of Detroit read his report, from which the following extracts are taken:

The Secretary's Report.

For many years during the recent severe business depression no one has suffered from all the evils manifest in that most trying time more than the foundry oper-

ators of the country, and as a result of this foundry proprietors have naturally shown a great aversion to doing anything toward improving facilities or in any way increasing their investment. With the advent of the great change, however, that has taken place in the business situation during the past few months a large number of deferred plans for improvement have been put into operation, and as a result more is perhaps being done in this line just now than at any previous time. It is being done more intelligently and not so much with an eye to immediate economy as for the purpose of permanent future benefit.

While in all associations of the purely voluntary character of this one there is sure to be more or less fluctuation in the membership, and for one reason or another, yet it is gratifying to know that the addition of new members in our case has kept our number slightly above the 300 mark, and this, too, without as aggressive a campaign for increase in this direction as might perhaps have been possible.

At our Detroit meeting in 1897 a committee that, with W. H. Pfahler as chairman, had been busily at work for some time, presented a report recommending that this association should lend all the assistance in its power to the formation of an association for the purpose of equitably and yet finally putting an end to all labor troubles in the foundries of its members, similar to those methods that had been so successful among the stove founders of the country. Growing out of this report and the preliminary work done by this association, the National Founders' Association was organized over a year ago, and the American Foundrymen's Association has much to be proud of in contemplating the splendid growth and the good work now being done by it.

Our receipts and expenses since our last convention have been as follows:

Balance on hand June 6, 1898	$414.79
Dues received	2,070.00
Total	$2,484.79

DISBURSEMENTS.

Journal	$808.84
Salary	1,171.00
Expense, incidentals or miscellaneous	83.15
Printing	65.75
Postage	94.19
Cash on hand	261.86
Total	$2,484.79

Treasurer Howard Evans of Philadelphia being absent on account of ill health, no report was made by him, and a telegram of sympathy was ordered to be forwarded to him by a special committee.

Dr. R. G. G. Moldenke of Pittsburgh read the report of the Committe on Standardizing Tests of Cast Iron. The committee, consisting of Thos. D. West, chairman; Dr. Moldenke, James Scott, P. W. Gates and E. H. Putnam, have been actively at work for the entire year investigating and experimenting on a large scale. The report showed the kinds of castings which had been selected for the investigations by the committee, the methods pursued in testing them and the results obtained.

The report was discussed by W. J. Keep of Detroit, who gave strong testimony from his own experience to the desirability of the work and the difficulties encountered in carrying it on. The report was received and the committee continued.

After announcements were made relative to the programme, an adjournment was taken until 8 p.m. The following is a list of members in attendance at the first session:

C. S. Bell, C. S. Bell & Co., Hillsboro, Ohio.
John A. Penton, The Foundry, Detroit, Mich.
William Yagle, Wm. Yagle & Co., Pittsburgh, Pa.
J. T. Seaman, Seaman, Sleeth & Co., Pittsburgh, Pa.
F. H. Zimmers, Union Foundry & Machine Company, Pittsburgh, Pa.
Isaac W. Frank, Frank-Kneeland & Co., Pittsburgh, Pa.
Phillips Mathes, Brittan & Mathes Co., Carnegie, Pa.
Dr. R. G. G. Moldenke, McConway Torley Company, Pittsburgh, Pa.
S. D. Sleeth, Westinghouse Air Brake Company, Wilmerding, Pa.
Robert Taylor, Taylor, Wilson & Co., Limited, Allegheny, Pa.
T. E. Malone, J. S. McCormick Company, Pittsburgh, Pa.
Samuel Hay, Whiting Foundry Equipment Company, Pittsburgh, Pa.
Howard M. Hooker, Rogers, Brown & Warner, Pittsburgh, Pa.
E. P. Botsford, Pittsburgh Malleable Iron Company, Pittsburgh, Pa.
George Rollings, Pittsburgh Malleable Iron Company, Pittsburgh, Pa.
R. Wise, Keystone Coal & Coke Company, Pittsburgh, Pa.
James Kelly, A. H. Childs, Pittsburgh, Pa.
E. A. Kebler, Matthew Addy & Co., Pittsburgh, Pa.
J. S. McCormick, J. S. McCormick Company, Pittsburgh, Pa.
W. T. Mobberley, Taylor, Wilson & Co., Allegheny, Pa.
S. H. Stupakoff, Union Switch & Signal Company, Swissvale, Pa.
S. T. Johnston, The S. Obermayer Company, Chicago, Ill.
C. L. Doyle, H. C. Frick Coke Company, Pittsburgh, Pa.
Dr. K. F. Stahl, General Chemical Company, Pittsburgh, Pa.
N. P. Hyndman, Washington Coal & Coke Company, Pittsburgh, Pa.
Victor Beutner, Julian Kennedy, Pittsburgh, Pa.
Edward Maher, Maher & Flockhart, Newark, N. J.
H. S. Vrosman, Fire Brick, Chicago, Ill.
R. C. Barr, Cleveland & Barr, Chicago, Ill.
John W. Burr, Burr & Houston, Brooklyn, N. Y.
Robert Blythe, Walker & Pratt Mfg. Company, Watertown, Mass.
Chas. B. Seaman, Seaman, Sleeth & Co., Pittsburgh, Pa.
Jos. S. Seaman, Jr., Seaman, Sleeth & Co., Pittsburgh, Pa.
J. W. Friend, Clinton Iron & Steel Company, Pittsburgh, Pa.
Eli Millett, Millett Core Oven Company, Springfield, Mass.
Oliver Wylie, Wm. Yagle & Co., Pittsburgh, Pa.
William Alstman, Jas. Collard & Co., Pittsburgh, Pa.
E. W. Anthony, Smith & Anthony Company, Boston, Mass.
J. S. MacDonald, Westinghouse Electric Company, Pittsburgh, Pa.
Benj. D. Fuller, Westinghouse Electric Company, Pittsburgh, Pa.
J. H. Johnston, Taylor, Wilson & Co., Pittsburgh, Pa.
W. J. Keep, Michigan Stove Company, Detroit, Mich.
Geo. H. Lincoln, Geo. H. Lincoln, Boston, Mass.
John Magee, Magee Furnace Company, Boston, Mass.
I. W. Winchester, Magee Furnace Company, Boston, Mass.
J. C. Slocum, E. H. & F. M. Root, Connersville, Ind.
W. Fitzpatrick, S. Obermayer Company, Cincinnati, Ohio.
Alex. Taylor, Westinghouse Electric Company, Pittsburg, Pa.
J. J. Burgen, Montpelier, Vt.
L. S. Brown, Springfield Facing Company, Springfield, Mass.
Alva Carpenter, A. Carpenter & Sons Foundry Company, Providence, R. I.
F. B. Farnsworth, McLagon Foundry Company, New Haven, Conn.
Victor Sewson, Condor Foundry Company, Boston, Mass.
C. W. Friend, Clinton Iron & Steel Company, Pittsburgh, Pa.
T. W. Friend, Clinton Iron & Steel Company, Pittsburgh, Pa.
E. B. Pierce, Wheeler Foundry Company, Worcester, Mass.
C. J. Langdon, Fulton Foundry Company, Cleveland, Ohio.
John F. Mills, Abendroth & Root, Port Chester, N. Y.
Willis Brown, Walker Foundry Company, Erie, Pa.
J. D. Smith, J. D. Smith Foundry Supply Company, Cincinnati, Ohio.
J. G. Sadlier, Springfield Foundry Company, Springfield, Ohio.
W. A. Jones, W. A. Jones Foundry & Machine Company, Chicago, Ill.
F. S. Cadwell, Hill & Griffith Company, Cincinnati, Ohio.
F. H. Irwin, Elliot Car Company, Gadsden, Ala.
John Hill, Hill & Griffith Company, Cincinnati, Ohio.
J. R. Homer, J. R. Homer Company, Galion, Ohio.
R. Wise, Keystone Coal & Coke Company, Pittsburgh, Pa.
M. F. Richardson, Ohio Cultivator Company, Bellevue, Ohio.
E. M. Drummund, Drummund Mfg. Company, Louisville, Ky.
F. F. Sheriff, Sheriff Mfg. Company, Wilwaukee, Wis.
D. B. Hyde, Safety Emery Wheel Company, Springfield, Ohio.
R. J. Scott, Struthers, Wells & Co., Warren, Pa.
F. C. Mosendale, M. A. Hanna & Co., Buffalo, N. Y.
H. M. Wilson, Taylor, Wilson & Co., Allegheny, Pa.
J. H. B. Bryan, Snow Steam Pump Company, Buffalo, N. Y.
C. L. Wolff, L. Wolff Mfg. Company, Chicago, Ill.
J. R. Russel, C. W. Russel, Russel Wheel & Foundry Company, Detroit, Mich.
J. C. Ford, Spring Lake Iron Company, Fruitport, Mich.
E. S. Reid, Whiting Foundry Equipment Company, Chicago, Ill.
E. S. Walker, J. I. Case Thrashing Machine Company, Racine, Wis.
W. W. Cheney, S. Cheney & Son, Manlius, N. Y.

Jno. A. Meighan, Dawson Bro. & Meighan, Pittsburgh, Pa.
R. M. Dyer, The Aermotor Company, Chicago, Ill.
O. F. Stantial, J. R. Steneck, Illinois Malleable Iron Company, Chicago, Ill.
Jno. W. Diven, Diven Bros. & Co., Baltimore, Md.
W. T. White, J. D. Smith Foundry Company, Cincinnati, Ohio.
Andrew MacDuff, Henry Miller, Stillwell-Bierce Company, Dayton, Ohio.
Victor E. Knecht, Phœnix Iron Company, Cincinnati, Ohio.
R. S. Buch, A. Buch Sons, Elizabethton, Pa.
J. H. Hillman, J. H. Hillman, Jr., J. H. Hillman Company, Pittsburgh, Pa.
B. E. Eagan, H. E. Pridmore, Boston, Mass.
Jas. S. Stirling, Harlan & Hollingsworth Company, Wilmington, Del.
Millard F. Carr, J. W. Paxson & Co., Philadelphia, Pa.
W. J. Early, W. A. Early, Jas. S. Early, Jno. N. Early, W. J. Early & Sons, Pittsburgh, Pa.
B. P. Bacon, Richards, Brown & Co., Chicago, Ill.
W. F. Prince, H. R. Worthington, Elizabethport, N. J.
Jno. Morcum, Colorado Iron Works, Denver, Col.
J. Cordingly, Queen City Foundry Company, Denver, Col.
A. G. Sotherland, Kansas Iron & Fire Company, Kansas City, Mo.
E. Kneeland, Frank-Kneeland Machine Company, Pittsburgh, Pa.
W. W. Sly, W. W. Sly Patent Cin. Mills, Cleveland, Ohio.
W. P. Warren, Jr., Tuttle & Warren Company, Troy, N. Y.
Fr. Cavanaugh, Roberts, Winter & Co., Quakertown, Pa.
Sirard Babbitt, Port Royal Coal & Coke Company, Pittsburgh, Pa.
W. W. McMillan, Damascus Bronze Company, Pittsburgh, Pa.
W. B. Sterritt, Sterritt & Thomas, Pittsburgh, Pa.
G. F. Eldridge, C. R. Baird & Co., Philadelphia, Pa.
J. W. Friend, Clinton Iron & Steel Company, Pittsburgh, Pa.
Chas. W. Hass, Stillwell-Bierce & Smith-Vaile Company, Dayton, Ohio.
J. R. Cullingworth, J. M. Stoeva, Robt. Wetherill & Co., Chester, Pa.
J. E. Lion, Brown & Sharpe Mfg. Company, Providence, R. I.
Bartlett M. Shaw, Walker & Pratt Mfg. Company, Watertown, Mass.
Wm. H. Switzer, Superior Foundry Company, Little Falls, N. Y.
M. A. Moran, Carnegie Steel Company, Pittsburgh, Pa.
Jno. McClaren, Phillips & McClaren, Pittsburgh, Pa.
Geo. Mesta, Mesta Machine Company, Pittsburgh, Pa.
G. M. Sharp, M. T. Sharp & Son, Steubenville, Ohio.
W. H. Rea, Mesta Machine Company, Pittsburgh, Pa.
J. H. Becker, Clinton Iron & Steel Company, Pittsburgh, Pa.
S. B. Robinson, Robinson Machine Company, Monongahela City, Pa.
Jesse Cornelius, Hecla Iron Works, Brooklyn, N. Y.
Robt. B. Lean, Crescent Foundry & Construction Company, Allegheny, Pa.
J. P. Golden, Golden Foundry & Machine Company, Columbus, Ga.
A. W. Walker, Walker & Pratt Mfg. Company, Boston, Mass.
D. J. Thomas, Sterritt & Thomas, Pittsburgh, Mass.
F. A. Goodrich, F. A. Goodrich & Co., Detroit, Mich.
L. W. Frazier, Keystone Coal & Coke Company, Pittsburgh, Pa.
F. H. Watt, Watt Mining Car Wheel Company, Barnesville, Ind.
Alex. Jarecki, Jarecki Mfg. Company, Erie, Pa.
H. S. Bell, C. M. Collins, Dodge Mfg. Company, Mishawaka, Ind.
W. C. Swift, Pridmore Molding Machine, Chicago, Ill.

TUESDAY EVENING.

(By Telegraph.)

The illustrated lecture by Walker of Boston last evening was a remarkably brilliant effort. The views of the Walker-Pratt Works were numerous and exhaustive of the establishment. The lecture was made more popular by incidental views of interesting features about Boston. The audience was large and enthusiastic. Little time was left for W. J. Keep to show his views of the Michigan Stove Works, but he acquitted himself very creditably and proved to be also an accomplished lecturer.

President Bell appointed the following Committee on Nominations of Officers: W. A. Jones, Chicago; Dr. R. G. G. Moldenke, Pittsburgh; Bartlett M. Shaw, Boston; James S. Stirling, Wilmington, Del.; J. P. Golden, Columbus, Ga.

The Wednesday morning session was opened by the reading of a report on the work of the association's Bureau of Standardizing Drillings of Cast Iron by Thomas D. West. The necessity for standards of this character in the foundry trade was set forth, after which the work of the bureau was described. It has been done at remarkably low cost, and the drillings are already being accepted as standard in the general iron trade. The committee in charge of the bureau was continued on motion of Fred. W. Bauer of Springfield, Ohio, and directed to consult with a committee of the American Chemical Society for the purpose of securing standard methods of analysis.

A paper was read by James Powell of Cincinnati, entitled "The History and Technics of Bronze Founding." This paper showed much research, dealing largely with the achievements of the ancients, but it also paid considerable attention to practical methods employed then and in more modern times in working in bronze.

The secretary read an interesting paper by John M. Richardson of Providence, R. I., entitled "The Importance of Fillets and Round Corners on Modern Machinery Castings." A discussion followed by Messrs. West, Groves of Pittsburgh, Diven of Baltimore, Dyer of Chicago, Bell of Hillsboro, Ohio, and Fuller of Pittsburgh.

The convention adjourned until Thursday morning.

A strong movement is on foot to select Chicago as the place of next convention. About 50 more names were added this morning to the membership in attendance.

On Thursday morning papers will be read by C. J. Wolff on "The Advantages of an Upper Floor Foundry for Light Castings," by Eli Millett on "An Improved Method for Setting Up Brass Furnaces," and by Thos. D. West on "The Deceptive Fracture of Pig Iron."

OUTSIDE THE CONVENTION.

In one of the parlors of the Monongahela House was exhibited the superb Penton collection of art castings. This collection represents the work of years and the expenditure of a large amount of money by John A. Penton of Detroit. It embraces plaques, mural decorations, statuettes, ornamental boxes and chests, and other forms of artistic work in cast iron. The specimens shown have been collected from all the leading nations, some of the finest and apparently the most difficult coming from the interior of Russia, the work of craftsmen whose ability is not ordinarily ranked as high as that of the artisan of several other countries. The Russian specimens were examined with great interest, the method by which they were so successfully cast being a mystery to our best founders. Some German plaques were also noteworthy, being shown just as they came from the sand, without an attempt at finishing, yet presenting a sharpness of outline and perfection of detail which excited general admiration. In the same room were shown other art castings by American foundrymen, as follows: The Magee Furnace Company and the Smith & Anthony Company of Boston, the Yale & Towne Mfg. Company of Stamford, Conn., F. & L. Kahn & Bros. of Hamilton, Ohio, the Chicago Hardware Mfg. Company, the American Radiator Company's Detroit branch and the Michigan Stove Company of Detroit. The American Radiator Company's work was conspicuously fine in this magnificent array of excellent specimens.

The Pennsylvania Car Wheel Company of Allegheny, Pa., exhibited specimens of the extra strong car wheels which they are casting for use under the large 100,000-pound cars now getting into service. They also showed parts of the wheels which had been broken to exhibit the fracture. Silico spiegel, imported from Scotland, is used as a strengthener in making these wheels. Samples of this alloy formed part of the exhibit.

Castings made from mold machine pig were exhibited by the Keystone Bridge Works of the Carnegie Steel Company, Pittsburgh.

Fine specimens of their regular work in casting were also exhibited by the Westinghouse Electric & Mfg. Company of Pittsburgh.

Matthew Addy & Co. of Cincinnati exhibited samples with analyses of sandless pig iron made by the Longdale Iron Company of Virginia.

Eli Millett of Springfield, Mass., exhibited a model of the Millett patent core oven, for which the S. Obermayer Company are Western agents.

The J. D. Smith Foundry Supply Company of Cincinnati, represented by J. D. Smith, W. T. White and E. L. Fitzmaurice, exhibited Coreine, to be used in dampening core sand, claimed to make the strongest, best vented and most durable cores, without smoke or odor.

E. S. Reid of the Whiting Foundry Equipment Company of Harvey, Ill., exhibited numerous photographs of foundry appliances.

H. S. Vroom of Chicago exhibited his patent arch fire brick for making furnace roofs.

The J. S. McCormick Company, foundry supplies, Pittsburgh, exhibited in their parlor a bicycle ingeniously constructed of foundry tools and equipped with foundry appliances.

The Hill & Griffith Company, foundry supplies, Cincinnati, were well represented by John Hill and F. S. Cadwell.

W. C. Swift, with Henry E. Pridmore, manufacturer of molding machines, Chicago, exhibited photographs of his specialties.

Views were shown of Uehling's method of casting and conveying metals, as in use at several blast furnace plants, handling pig iron.

The Carborundum Company, Niagara Falls, N. Y., exhibited samples of their abrasives.

In glass cases Dr. Moldenke exhibited a large number of samples of fractures of green sand and dry sand test bars, set A cast by Thos. D. West, set B cast by Jos. S. McDonald, and presented by the Westinghouse Electric & Mfg. Company, set C cast by Jos. S. McDonald and Benj. D. Fuller, and presented by the same company. Some of these bars were as large as 4 inches square.

The S. Obermayer Company, foundry supplies, were well represented by S. T. Johnston of Chicago, manager of the equipment department, who made room nine one of the most popular places in the Monongahela House.

S. P. Haller of Pittsburgh exhibited an old wood stove cast in 1789 by Wm. and Sam Moore, and a side plate of similar stove cast in 1772 by Dan and Sam Hughes at Antietam Furnace, as shown by the names and dates cast on them.

A large Japanese bell, a quaint specimen of bronze casting, was exhibited by H. K. Porter of Pittsburgh.

Chas. Herman & Sons of Allegheny, Pa., exhibited a specimen of their molding machines, adapted to the production of small castings.

J. S. Brown of the Springfield Facing Company, Springfield, Mass., distributed ingeniously contrived match boxes.

The Keystone Coal & Coke Company, Pittsburgh, distributed celluloid cases containing court plaster to heal probable bruises.

The local committee, of which I. W. Frank was chairman, made elaborate preparations for the entertainment of the members and their ladies. The badges were of white metal, the body being in the shape of a keystone, suitably inscribed and bearing on it a cupola, from the bottom of which dangled a crucible, the whole being suspended from a bar with the word Pittsburgh on it. Every member was also given a button numbered to correspond with his name on the official register, thus serving for identification by other members. The committee further provided a souvenir programme, beautifully printed and tastefully illustrated, setting forth the details of the business sessions and the entertainment. The latter consisted of a trolley ride to Schenley Park and the Carnegie Institute on Tuesday afternoon, an excursion to the Westinghouse works on Wednesday afternoon, a reception at the Hotel Schenley on Wednesday evening, a boat excursion to the Carnegie Steel Company's Homestead works on Thursday afternoon and a smoker at the Monongahela House on Thursday evening.

The Warwick Iron & Steel Company.—The Warwick Iron & Steel Company have been incorporated under the laws of Pennsylvania with a capital stock of $1,500,000, of which $1,000,000 is to be issued at 105, the shares being $10; through H. F. Bachman & Co. of Philadelphia. The balance of $500,000 is to remain in the treasury for future use. The company take over the Warwick furnace, which has paid dividends under the management of Edgar S. Cook and Jacob Fegely for a good many years, besides providing for the steady improvements. The plan is to build a second modern furnace and the construction of a steel plant is a future contingency. Edgar S. Cook will continue as president and manager.

The Westinghouse Electric & Mfg. Company of Pittsburgh have received a contract to supply the electrical lighting apparatus for the White House and the White House grounds at Washington, D. C. Two 8 horse-power 125 volt direct current engine type generators will be installed in the State, War and Navy Department Buildings at Washington as an addition to the old plant. A number of Westinghouse electric motors are being constructed for the United States Government to be installed at the navy yard at Norfolk, Va. A number of generators and motors of this company are now being shipped to the United States Navy Dry Dock at Boston, Mass., to install a plant there.

The Carnegie Reorganization.

(By Telegraph.)

PITTSBURGH, May 17, 1899.—H. C. Frick has issued the following statement: "The consolidation or merging of the Carnegie Steel Company and Frick Coke Company interests is yet in a formative state. No definite plans have been concluded, financial or otherwise. Many suggestions have been made and considered, but no conclusion reached. We have not authorized any statements or publications as to our business and its earnings past, present or prospective. If it should so happen that we decide to offer to the public the right to subscribe to any share of the business, the offer will be accompanied by a careful statement of its condition subscribed to by Henry Phipps and myself, and such others as may be connected with the reorganization. The Chicago telegram referred to is probably based upon an accidental disclosure of some tentative suggestions that have been made in reference to the subject."

It is a fact that the capital stock is to be $525,000,000, $250,000,000 preferred and $275,000,000 common, and $100,000,000 5 per cent bonds to Carnegie, secured by first mortgage on all plants. There is a possibility that the public may not be asked to subscribe.

Trade Publications.

Hand Planer and Jointer.—The Egan Company of Cincinnati, Ohio, are introducing a new form of planer and jointer, in which the front table can be set from the front or from the end of the machine without loosening any bolts. Both tables are fretted with steel lips where they approach the cutters, thereby allowing them to be brought closer together than usual. The frame is one entire casting, and being extra heavy enables the machine to run very smoothly and without any vibration. The front table is full 4 feet long, and the frame and inclines come under the tables and give them full support to the outer ends, which is far better than any overhanging tables. The cylinder and journals are of forged steel. Two sides of the head are plain to receive the long knives, the other two slotted for use of beading, molding and other cutters. Its journals are of large diameter, long and run in self oiling boxes, constructed to continually flow sufficient oil to the journals. Suitable and easy adjustment is also provided for making of hollow joints for glue jointing. It is capable of a full line of work, such as glue joints, planing out of wind, &c. The patent adjustable fence is stationary at the table and inclines from the top part. The fence is fastened on the back table, and is fastened just where the operator presses the stuff being planed, and it is free from springing.

Molding Machines.—The J. W. Paxson Company, Philadelphia, Pa., have just issued a catalogue intended to be supplementary to their general catalogue No. 11, descriptive of a full line of molding machines. Groves' patent gear molding machine for molding spur, bevel, helical, staggered or worm toothed gearing from 6 to 72 inches diameter and to 15-inch face is fully described and illustrated. The Farquhar pulley molding machine is also shown, and its adaptability for making pulleys of any diameter or face explained. Considerable space is devoted to the Little Giant molding machine, especially designed for making small brass and iron castings such as are required by plumbers, steam fitters machinists and others. The claim is made that about 75 per cent. of all ordinary snap work can be made on this machine. The Tabor and McCanna molding machines are also accorded space in the book.

Oil Cups, Injectors, &c.—The Eynon-Evans Mfg. Company, Philadelphia, have just issued a 24-page catalogue which they entitle "Cullings from Our General Catalogue of Railroad Specialties." Much space is given to locomotive oil cups, the illustrations used being the full size of the cups. The method commonly used in making locomotive oil cups is to provide a brass base and solder the circular body to the same. The cups shown in the catalogue are made differently, the base and body being cast solid and the interior and exterior surfaces milled, on special machines, to the proper diameters. The cups are exceptionally heavy, and designed to withstand the hard usage common to cups used in locomotive work. Other goods shown are gauge cocks and cylinder drainers, especially heavy, and designed to stand high pressures; and blower elbows, equally heavy, and made of the best bronze. The concluding pages of the book are devoted to the Eynon Korting injector.

The Iron and Metal Trades.

The official announcement by H. C. Frick that the Carnegie-Frick merger is still in a formative condition, and that no official statements of valuations or earnings have been authorized, should put many erroneous reports at rest. It is true that it is proposed to capitalize at $250,000,000 preferred 6 per cent. non-cumulative stock and $275,000,000 common stock, and that there is to be an issue of $100,000,000 of 5 per cent. general mortgage bonds, with about $8,000,000 prior bonds on the Coke property. For one share of preferred and one share of common subscribers are to pay 106, according to some reports, which add that the earnings at present prices on the full capacity would figure out at the rate of nearly $40,000,000 per annum. In the trade the opinion is widely expressed that the capitalization named includes a reserve for the acquisition of other interests.

Until the details are known, it is useless to speculate upon the influence of these developments upon the future of the industry in this country. Every one of the large consolidations is strengthening its position by adding to surplus, by acquiring new Ore and Coke properties, by forming alliances and by improving and enlarging plant. Much of the buying of old fashioned works is merely for the purpose of securing additional capacity for immediate needs, to be practically abandoned later on. In the meantime, additional new plants are being started. Thus the National Steel Company have decided to build three modern furnaces, and in the East two blast furnaces are to be erected by old producers. These additions, and the considerable number of new works, will not be available until well toward the close of next year.

The markets in the Central West have been active, and the shortage of Pig Iron and Steel is more and more emphasized. Our Pittsburgh correspondent reports some large transactions in Bessemer Pig and Billets, and there has been a further advance in the former. The Southern furnaces have placed considerable quantities of Basic Pig, while in Foundry Iron a hardening tendency has developed. Southern makers are asking higher prices. Negotiations for some of the large interests in Birmingham by Northern parties are under way.

The Eastern Bar Iron manufacturers are to have a meeting on Friday in the matter of the proposed consolidation.

No exceptionally large transactions have taken place in Finished Iron and Steel, really because it is impossible to place orders for quite a number of lines, like Rails, Plates, &c. In Bars, in the West, the new Republic Company are now getting into shape to close contracts.

In some lines, however, orders are being held back by jobbers and distributers in the belief that prices are now too high and must soon recede. The demand for the cruder forms does not encourage the belief that a reaction is possible for many months. Nor has there been any evidence as yet that actual consumption has been checked by the prices now prevailing.

In the Copper trade the buying is restricted to pressing and immediate requirements. Instances have occurred, however, where large blocks have been placed for future delivery, the manufacturers preferring to cover sales of goods even at prices close to 18c. for Lake. Still, some of the producers admit that the fall may bring 15c. Copper.

A Comparison of Prices

At date, one week, one month and one year previous.

Advances Over the Previous Month in Heavy Type. Declines in Italics.

	May 17. 1899.	May 10, 1899.	Apr. 19, 1899.	May 18, 1898.
PIG IRON:				
Foundry Pig, No. 2, Standard, Philadelphia	$15.75	$15.75	$15.75	$10.50
Foundry Pig, No. 2, Southern, Cincinnati	14.50	14.50	14.50	9.00
Foundry Pig, No. 2, Local, Chicago	**15.50**	15.50	15.00	11.00
Bessemer Pig, Pittsburgh	**16.50**	15.65	15.00	10.30
Gray Forge, Pittsburgh	**15.00**	14.75	14.50	9.15
Lake Superior Charcoal, Chicago	17.00	17.00	17.00	11.50
BILLETS, RAILS, ETC.:				
Steel Billets, Pittsburgh	**27.00**	26.00	25.50	15.00
Steel Billets, Philadelphia	**29.00**	28.50	27.50	17.00
Steel Billets, Chicago	**28.00**	27.00	25.50	17.00
Wire Rods, Pittsburgh	.....	32.00	.....	20.50
Steel Rails, Heavy, Eastern Mill	*25.00*	25.00	26.00	18.00
Spikes, Tidewater	1.70	1.70	1.70	1.40
Splice Bars, Tidewater	1.40	1.40	1.40	1.05
OLD MATERIAL:				
O. Steel Rails, Chicago	*11.00*	11.50	11.50	8.00
O. Steel Rails, Philadelphia	*14.00*	14.00	15.00	10.25
O. Iron Rails, Chicago	*17.00*	18.00	18.00	12.25
O. Iron Rails, Philadelphia	18.00	18.00	18.00	12.00
O. Car Wheels, Chicago	**15.50**	14.75	15.00	11.50
O. Car Wheels, Philadelphia	15.00	15.00	15.00	10.25
Heavy Steel Scrap, Chicago	*8.50*	10.00	10.50	8.00
FINISHED IRON AND STEEL:				
Refined Iron Bars Philadelphia	**1.55**	1.55	1.50	1.05
Common Iron Bars, Youngstown	1.50	1.55	1.50	0.95
Steel Bars, Tidewatar	1.75	1.75	1.75	1.10
Steel Bars, Pittsburgh	**1.65**	1.65	1.60	0.95
Tank Plates, Tidewater	2.25	2.25	2.25	1.30
Tank Plates, Pittsburgh	2.10	2.10	2.10	1.10
Beams, Tidewater	*1.63*	1.63	1.65	....
Beams, Pittsburgh	1.50	1.50	1.50	....
Angles, Tidewater	1.65	1.65	1.65	1.15
Angles, Pittsburgh	1.50	1.50	1.50	1.05
Skelp, Grooved Iron, Pittsburgh	**1.80**	1.70	1.65	1.05
Skelp, Sheared Iron, Pittsburgh	**1.95**	1.90	1.90	1.12½
Sheets, No. 27, Chicago	2.90	2.90	2.90	2.10
Sheets, No. 27 Pittsburgh	**2.70**	2.70	2.50	1.90
Barb Wire, Galv., f.o.b. Pittsburgh	2.70	2.70	2.70	1.65
Wire Nails, f.o b. Pittsburgh	2.10	2.10	2.10	1.30
Cut Nails, Mill	1.65	1.65	1.65	1.07½
METALS:				
Copper, New York	18.50	18.50	18.50	12.00
Spelter, St. Louis	**6.70**	6.75	6.30	3.95
Lead, New York	**4.45**	4.45	4.32½	3.65
Lead, St. Louis	**4.32½**	4.35	4.17½	3.60
Tin, New York	**25.65**	24.30	25.12½	14.50
Antimony, Hallett, New York	10.00	10.00	10.00	8.75
Nickel, New York	38.00	38.00	38.00	34.00
Tin Plate, Domestic, Bessemer, 100 lbs., New York	4.05	4.05	4.05	2.90

Pittsburgh.

Office of *The Iron Age*, Hamilton Building,
PITTSBURGH, May 17, 1899.

(By Telegraph.)

Pig Iron.—There is no established price on Bessemer Pig, the Price Committee acting on each inquiry as it comes up. However, the market is fully $1 a ton higher and the price of Bessemer Pig is all of $16 at Valley furnace. The last stock report issued shows the lowest stocks of Iron ever held by the furnaces and all indications point to a considerable shortage in supply. The wants of leading consumers for last half have been estimated and it has been figured out from this that with the producing capacity of both Valleys driven to its utmost there will be a shortage anywhere from 100,000 to 150,000 tons, and it may be more. A leading consumer of Bessemer Pig and Steel has recently come in the market and bought fully 60,000 tons and is understood to be inquiring for considerable additional Iron. One other consumer is reported to have bought 40,000 to 50,000 tons, and these sales, coupled with the trades of Iron for Steel, show that fully 200,000 tons of Iron have changed hands recently. There have also been heavy sales of Gray Forge in addition to those reported in this report last week and the preceding week. One consumer has bought 40,000 tons of Southern Forge and considerable additional local Iron. This has forced up the price of Mill Iron and the market to-day is all of $15, Pittsburgh, with Valley furnaces quoting $14.50, equal to $15.15, Pittsburgh. There is considerable inquiry and higher prices are altogether probable. Foundry Irons are higher and we have advanced quotations on No. 2 Foundry. We now quote: Bessemer Pig, $16; Gray Forge, $14.50, both at Valley furnace; No. 2 Foundry, $15.25 to $15.50; Gray Forge, $15 to $15.15; Bessemer, $16.50 to $16.65, all f.o.b. Pittsburgh. While $16, Valley furnace, would have to be paid for Bessemer Pig in any considerable quantity, it is possible that a few small lots held by dealers might be had at a trifle under that price. In addition to sales noted above we can report a sale of

35,000 tons of Bessemer Pig at a price close to $16, Valley furnace, made two or three days ago; also a sale of 1500 tons at $15.60, Valley furnace, made last week.

Billets.—There is a great deal of inquiry for Billets, particularly from Eastern consumers, and prices are very strong. Local mills have practically no Steel to spare, but on little lots for May and June shipment quote $27 at mill. It now transpires that the purchases of Steel by the American Steel Hoop Company are much larger than at first reported and aggregate considerably over 200,000 tons. It is stated that this concern are covered on Steel into next year. The prices they bought at were considerably lower than the market to-day. We can report a sale of 1000 tons of Slabs for Eastern shipment at about $27, f.o.b. Pittsburgh.

(By Mail.)

Additional facts have come out in the week relating to the reorganization of the Carnegie Steel Company, Limited. The new capital stock will be $625,000,000, $250,000,000 preferred and $275,000,000 common, the excess of common over the preferred going to the underwriters. There will also be $100,000,000 5 per cent. first mortgage bonds, which will be held by Andrew Carnegie, netting to him an income of $5,000,000 a year. The subscriptions are being taken at 106, or in other words the subscriber for 100 shares of preferred stock will pay $10,600 for it and will receive 100 shares of preferred and 100 shares of common. Subscription books have been opened in Chicago, New York, Boston, Philadelphia and Pittsburgh. It is stated there will be no important changes among the officials of the concern. Nothing of special moment in the Iron trade developed during the week. There has been a fairly active demand for Bessemer Pig for third quarter, and some sales have been made at $15, Valley furnace. There is a moderate inquiry for Steel in small lots and sales at practically $27, Pittsburgh, have been made. The principal inquiry for Steel is from the East, consumers in that section evidently not having covered their requirements into second half. In Finished Material the volume of business is enormously heavy, with the mills as far behind in shipments as ever. The tonnage both in Raw and Finished Material being turned out is something enormous and away ahead of anything ever done before. The present activity is assured for balance of this year, and predictions have been made that the great activity now existing may continue for two or three years. It is likely within the next couple of weeks the new Sheet mill consolidation and the Tube mill consolidation will both be launched. It is understood the latter is practically completed and will be put out this week.

Ferromanganese.—We continue to quote domestic at $75, maker's mill, for large lots, while considerably higher prices are asked for small lots for immediate shipment. There is not much doing.

Structural Material.—Bids for 13 Steel bridges for Allegheny County will be opened on Wednesday, May 17. A fair tonnage is involved. There is a moderate demand for Beams and Channels in small lots, but no specially large contracts have recently been placed. For other forms of Structural Material, such as Angles and Plates, the demand is much more active. Prices are unchanged, and we quote Beams and Channels, 15-inch and under, 1.50c.; 18, 20 and 24 inch, 1.60c.; Tees, 1.55c.; Universal and Sheared Plates, 2.10c. to 2.25c., depending on the order; Zees, 1.50c.; Angles, 3-inch and over, 1.50c.; 2, 2½ inch, 1.90c.; 2¼-inch and smaller, 2c., all f.o.b. Pittsburgh.

Plates.—The leading local mill is quoting 2.25c. for Plates for August and September delivery. Several large orders for Boat Plates have been placed in the past week, the material going to Eastern mills, some of which do not seem to be as well filled up as Pittsburgh mills and are shipping Plates into this territory. One local mill is reported to have its entire tonnage under contract up to December of this year. Prices are as firm as they have been at any time, and where prompt Plates are wanted a premium has to be paid. We quote Tank Plate, ¼-inch and heavier, 2.10c. to 2.25c.; Shell, 2.25c. to 2.30c.; Flange, 2.35c. to 2.40c.; Marine, 2.50c. to 2.60c.; Fire Box, 2.50c. to 3.25c., depending on quality.

Bars.—Some of the mills taken over by the Republic Iron & Steel Company are in shape for business and beginning to quote. Others are closed down for inventory and are practically out of the market as sellers. This has interfered very materially with production and prompt shipments are still more difficult to get. There is a good demand for Iron Bars in moderate lots, but no very large contracts have recently been placed. We quote Iron Bars at 1.50c. to 1.55c., half extras, at mill. There is a heavy demand for Steel Bars, and some large consumers are figuring on contracts for shipment over last half of the year. Local mills rolling Steel Bars are filled up and behind on deliveries. We quote Steel Bars at 1.65c. to 1.70c. at mill, half extras.

Sheets.—We are advised that fully 75 per cent. of the producing capacity of Sheets have given options on their plants, and there is every assurance of the Sheet mill consolidation going through at an early date. The fact that the supply of Sheet Bars is controlled by the National Steel Company and the Tin Plate trade by the American Tin Plate Company leaves a consolidation of the Sheet mills the only logical thing to be done. With negotiations going on the mills are refusing to quote for second half of the year, in spite of persistent urging by buyers. There is a very heavy inquiry, as it is the general impression that as soon as the Sheet mills have been taken over into one company there will be a material advance in prices. We quote No. 27 Black Sheets, one pass through cold rolls, at 2.70c. to 2.75c.; No. 28, 2.75c. to 2.80c. We are advised that in some cases where prompt delivery is made higher prices have been paid for Sheets. The demand for Galvanized Sheets is heavy, and buyers are placing orders more liberally than some time ago. We quote Galvanized Sheets in large lots at 75 per cent. off, with 15c. freight allowance. For small lots higher prices are quoted.

Iron and Steel Skelp.—The scarcity of Skelp for prompt delivery is increasing and prices seem to be higher. On inquiries for round lots of Grooved Iron Skelp, 1.90c., Pittsburgh, has been quoted. Demand is heavy, the steady operations of the Pipe mills causing very large consumption. We quote: Grooved Steel Skelp, 1.75c. to 1.80c.; Sheared Steel Skelp, 2.10c. to 2.25c.; Grooved Iron Skelp, 1.80c. to 1.85c.; Sheared Iron Skelp, 1.95c. to 2.10c., all f.o.b. Pittsburgh. A sale of 600 tons of Grooved Iron Skelp is reported at 1.80c., Pittsburgh.

Spelter.—The market is very strong and we quote prime Spelter at 6.75c. to 6.85c., Pittsburgh.

Pipes and Tubes.—If present plans do not miscarry the consolidation of the Tube mills into the National Tube Company will be completed this week. All the principal Pipe mills in the country will be taken over. There is a fair demand for Pipes and Tubes, but not as heavy as some time since. Several of the leading mills have been practically out of the market as sellers for some time, having all the tonnage on their books they care to take. We quote Merchant Pipe at 60 and three 10's in small lots, f.o.b. maker's mill, with an additional 5 in carloads delivered. Demand for Casing is very heavy and prices strong. We quote Screw and Socket Joint at 50 per cent., Inserted Joint at 45 per cent., with an extra 5 per cent. to dealers. Another advance in Boiler Tubes is talked of and demand is heavy. We quote: 1¼ and 1½ inch, Iron or Steel, at 45 per cent. off list; 1¾ to 2½ inch, inclusive, Iron, 55 per cent.; Steel, 60 per cent.; 2¾-inch and larger, Iron, 60 per cent.; Steel, 62½ per cent., with an optional 5 per cent. to dealers.

Connellsville Coke.—Last week there were over 16,000 ovens in the Connellsville region active and only a little over 2000 idle, the production being about 175,000 net tons. Demand for Furnace and Foundry Coke is very heavy and practically the entire output of the region is under contract. All the large consumers of Blast Furnace Coke have made contracts for second half of the year, but for small lots about $2 is being quoted for strictly Connellsville. Some brands of outside Furnace Coke are being offered at a lower price. Strictly Connellsville Foundry Coke is in active demand and prices strong. It is quoted at $2.15 to sellers and $2.30 to consumers with some brands not so favorably known being offered at slightly lower figures.

Chicago.

Office of *The Iron Age*, 805 Fisher Building,
CHICAGO, May 16, 1899.

The consumers who are earnestly hoping for a break in the price of Iron and Steel to correspond with the recent break in the stock market will evidently have a long wait. All the indications are in favor of higher rather than lower prices. The heavy consumption of Iron and Steel continues, and unless a great national calamity interferes it will keep up for months to come. The scarcity of material has become more pronounced, and the additional productive capacity now becoming available falls short of meeting the requirements of the market.

Pig Iron.—The situation is exceedingly strong. The whole stock of Pig Iron in the country is now practically equal to only a week's supply. Consumers are thus right on the heels of the producers. The advance made last week in the price of local Iron has stimulated buying. Consumers who had been on the fence hastily made up their minds and placed orders for what they may need for the remainder of the year. More business was done in a few days than in six or eight previous weeks. A heavy shortage in Iron in this district is predicted by producers in the next 12 months if the consumption keeps

up to its present rate. Some Southern furnace companies have added another 25c. to their prices during the week, which takes them a little above the level of other concerns. Transactions in Southern Iron have not been numerous, but this is mainly because few sellers are found able to meet the wishes of buyers as to delivery. We quote for cash as follows:

Lake Superior Charcoal	$17.00 to $18.00
Local Coke Foundry, No. 1	16.00 to 16.50
Local Coke Foundry, No. 2	15.50 to 16.00
Local Coke Foundry, No. 3	15.00 to 15.50
Local Scotch, No. 1	16.50 to 17.00
Ohio Strong Softeners, No. 1	17.00 to 18.00
Southern Silvery	16.00 to 16.25
Southern Coke, No. 1	16.00 to 16.25
Southern Coke, No. 2	15.50 to 15.75
Southern Coke, No. 3	15.00 to 15.25
Southern Coke, No. 1 Soft	15.75 to 16.00
Southern Coke, No. 2 Soft	15.50 to 15.75
Foundry Forge	14.25 to 14.50
Gray Forge and Mottled	14.25 to 14.50
Southern Charcoal Softeners	16.00 to 16.50
Alabama and Georgia Car Wheel	18.00 to 19.00
Malleable Bessemer	16.00 to 17.00
Standard Bessemer	16.00 to 17.00
Jackson County and Kentucky Silvery, according to Silicon	18.00 to 19.00

Bars.—The Republic Iron & Steel Company are now getting their offices in shape in this city, and in a few days will be prepared to make quotations. Meanwhile the market is unsettled on Bar Iron, with a great deal of business ready to be placed. It is likely that something could be done at 1.62½c. to 1.65c., Chicago, for mill shipments of Common Iron. Good inquiries are being received for Soft Steel Bars, many implement manufacturers now being ready to place contracts for their year's supply. Manufacturers quote at 1.70c. to 1.80c., Chicago, for mill shipment. Hoops are maintained at 2.05c., Chicago, base, for Bands. Jobbers quote Bar Iron at 1.85c. from stock. Soft Steel Bars at 1.80c. to 1.85c., and Norway and Swedish Iron at 3.20c. to 3.25c. to the large trade and 3.50c. for small lots.

Car Material.—Not much business is now coming up. The car works are all actively employed, having contracts covering their capacity far into the future, but new car orders are few and far apart.

Structural Material.—The Toledo Bridge Works secured the contract for the Drainage Canal bridge. A good demand is noted for all kinds of Structural Material from the country, all the small bridge works being exceedingly busy and coming into the market frequently. No large contracts are in sight at present, but the mills are well supplied with work and prices are firmly maintained. Mill shipments are quoted as follows, Chicago delivery: Beams, 18 inches and over, also Angles under 3 and over 6 inches, 1.75c. to 1.85c.; Beams and Channels, 15 inches and under, and Angles 3 to 6 inches, 1.65c. to 1.75c.; Tees, 1.70c. to 1.80c.; Universal Plates, 2.15c. to 2.25c. Store prices are from ¼c. to ½c. above these prices.

Plates.—The largest Pittsburgh manufacturers report their entire output sold for the remainder of the year, thus cutting off the expectations of consumers of some relief after July. The local mills are only taking business from railroads and a few old customers, turning down numerous inquiries from the general trade. Business in fact seems to be confined to jobbing houses, who fortunately have large stocks on hand and are able to make prompt shipments. They are getting 2.50c. to 2.85c. for Tank Steel and corresponding prices for other grades.

Merchant Pipe.—The situation is not changed so far as manufacturers are concerned, who are sold far ahead and unable to promise delivery inside of three or four months. Prices are quoted at three 10's, but a few jobbing houses are inclined to realize on their stocks and are making concessions below the mill rates. The market is so strong and the outlook for business is so good that this seems to be a questionable policy, although it operates nicely to the advantage of consumers. Merchant Boiler Tubes are now quoted in small lots, 1¼ to 1¾ inches inclusive, 40 per cent. off; 2 to 2¾ inches inclusive, 52½ per cent. off; 3 inches and larger, 57½ per cent. off, with an extra 5 off for carload lots.

Sheets.—The Sheet trade is decidedly unsettled, as almost all manufacturers have withdrawn quotations. An inquiry sent to all principal concerns brought out a reply from only one, who quoted 2.90c. at mill for No. 27 Black with one pass through cold rolls. Jobbers are in some instances doing better than this, selling carload lots from stock as low as 2.85c., Chicago. Galvanized Sheets are quoted at 70 and 10 per cent. off for mill shipments, with also a very few concerns now naming prices. Jobbers quote small lots from stock at 2.90c. to 3.15c. for No. 27 Black, 3.35c for Wood's Smooth, and 70 and 5 per cent. off to 70 and 10 per cent. off for Galvanized.

Merchant Steel.—A good demand is noted in small lots with some inquiry coming up from implement manufacturers for their yearly contracts. Mill shipments, Chicago delivery, are quoted as follows: Smooth Finished Machinery Steel, 2.40c. to 2.50c.; Smooth Finished Tire, 2.20c. to 2.30c.; Open Hearth Spring Steel, 2.40c. to 2.50c., base; Toe Calk, 2.40c. to 2.50c., base; Ordinary Tool Steel, 5.50c. to 7c.; Specials, 10c. and upward. Jobbers are quoting small lots from stock at 2.70c. for Tire, 2.90c. for Machinery, 2.90c. for Spring, and 2.90c. for Toe Calk, full extras.

Billets and Rods.—Consumers are making inquiries for Billets, but the local mills have none for sale and much difficulty is experienced in getting any from outside sources. It is probable that under the circumstances $28 would not be far from the price they are compelled to pay. The Wire Rod situation is unchanged, the local mills being unable to consider business for earlier delivery than July. The last sale made was at $35.

Rails and Track Supplies.—Transactions in Rails have been limited to small quantities, seldom running above carload lots, which are being purchased by makers of Frogs and Crossings. Standard Sections are quoted at $26 to $28, according to quantity, and Light Weight Sections at $30 to $37, acording to weight. Track Supplies are quoted as follows: Splice Bars, 1.40c. to 1.50c.; Spikes, 2.10c. to 2.15c.; Track Bolts, with Hexagon Nuts, 2.65c. to 2.75c.; Square Nuts, 2.55c. to 2.65c.; Steel Links and Pins, 2.15c. to 2.20c.; Iron Links and Pins, 2c.

Old Material.—The market has been irregular, some dealers being favored with fair business while others have found trade rather quiet. The market is inclined to weakness particularly on Old Iron Rails and Cast Scrap. It is stated that holders of Old Iron Rails are endeavoring to find buyers, and some dealers report that not over $17 could be realized. Our quotations are unchanged, however, in the absence of sales. Dealers' selling quotations are as follows, per gross ton: Old Iron Rails, $18; Old Steel Rails, mixed lengths, $11 to $11.50; Selected Long Lengths, $12 to $12.50; Relaying Rails, $18 to $19; Old Car Wheels, $15.50; Heavy Melting Steel Scrap, $10; Mixed Steel, $8.50. The following selling prices are per net ton: No. 1 Railroad Wrought, $16 to $16.50; Dealers' Forge, $12.50; Fish Plates, $16; No. 1 Mill, $9 to $9.50; Heavy Cast, $11 to $11.25; Stove Plates, $7 to $7.50; Iron Car Axles, $18.50; Horseshoes, $11.50; Cast Borings, $5.50 to $6; Steel Axle Turnings, $8.25; Iron Axle Turnings, $9; Machine Shop Turnings, $7.

Metals.—Copper is a little lower, carload lots of Lake being quoted at 19c. and Western at 18c. Spelter is higher, being held at 6.80c. Pig Lead is also stronger and is now quoted at 4.45c.

Tin Plate.—The demand is very strong and jobbers are receiving a great deal of inquiry from buyers who usually purchase direct from the factories. Coke Brights and low grade Ternes are extremely scarce. Manufacturing consumers are short of Cokes and picking up stocks wherever they can find them. Prices, however, appear to be unchanged.

Joseph R. Lehmer, Railway and General Supplies, has removed from 303 and 305 South Thirteenth street to 1212 Farman street, Omaha, Neb., occupying the entire building.

Philadelphia.

Office of *The Iron Age*, Forrest Building,
PHILADELPHIA, PA., May 16, 1899.

The past week has developed a distinct change in the general tone of the market. For a month past there were very few changes, prices were steady, but the upward movement was halted, and at times it looked as though there might be a reaction toward lower figures. The situation now, however, appears to be on the verge of another change. Buyers are inquiring for large blocks of material, and sellers are again considering the question, not of whether they should advance prices, but how much they should advance them. There is no concerted movement. Each concern follow their own ideas, and prices are made as circumstances seem to make desirable in each individual case. It is significant, however, that from a small discount on long deliveries there is now quite a sharp premium, due to an increasing pressure to cover requirements for the balance of the year. The prospect as regards being able to meet the demand is not satisfactory. There is already an unprecedented scarcity of material, and as deliveries are a long way behind, without any definite prospect of catching up, the situation is far from encouraging to those who have been calculating on larger supplies. To make up for the shortage in Steel, there has been an extraordinary increase in the output of Puddled Iron, and if skilled labor could be had the output would be vastly larger. This class of work

has been practically obsolete for some years past, however, so that skilled labor is extremely scarce. Nevertheless, some authorities claim that the output of Puddled Iron during 1899 will not fall much behind some of the greatest years we ever had, and if the right kind of labor could be had it would probably surpass all former records. Taking everything into account, therefore, it seems as though the market is not only on the verge of increased activity, but as the season advances, prices are almost certain to be advanced quite materially.

Pig Iron.—The market is very strong. Prices are extremely hard to quote, as some continue at the old prices, while others get advances varying from 25c. to 75c. per ton. It is a "go as you please" market all the way through; one man makes a price, and if it is accepted well and good, or if the buyer goes elsewhere and does better it causes no worriment to the one who lost the sale. In 25 years' experience the writer never saw the time when sellers cared so little as they do now in regard to what others were doing, or whether their prices were above the market or below it. For this rason prices are irregular. In some cases it may be that $15.75 is quoted for No. 2 X Foundry; others will quote $16 or $16.25, and appear to get it just as easy as the other at the lower figure. It should be noted, however, that the lower the price the smaller the quantity, and the larger the quantity the higher the price, from which it appears that while a low price may be accepted for a small lot, sellers are afraid to take large lots unless at a considerable premium. For instance, on a lot of several thousand tons for delivery during the last six months of the year the buyer had to pay over $16 for No. 2 Plain, while for an ordinary delivery it is quite possible that small lots could be had at about $15.50. All the indications, therefore, favor the idea of higher prices in the near future. Consumption is enormous and appears to be increasing as rapidly as the facilities for turning out more goods can be made available. The last monthly statement made by *The Iron Age* in regard to the condition of furnaces and stocks on hand is probably more convincing than anything else that could be presented, and the trade are beginning to realize that fact. For the present, however, it need only be said that the market is beginning to shape itself for higher figures, but how soon they may become effective, and to what extent, is something which time alone can tell. For the present the range of prices is about as follows for seaboard or equivalent points, and on long deliveries 25c. to 75c. per ton more is usually asked: No. 1 X Foundry, $16.50 to $17; No. 2 X Founddy, $15.75 to $16.25; Plain, $15.25 to $15.50; Standard Mill Iron, $15.25 to $15.50; Cinder Irons, $14.25 to $14.50; Basic, $15.75 to $16; Low Phosphorus, $19 to $19.50, according to points of delivery.

Billets.—There is not much business doing, mainly because large lots of Steel cannot be had, and in part because buyers would just about as soon take their chances as pay the prices now demanded. One small lot for June delivery sold at over $30, but for dates covering 60 days, and beyond that, $29 to $29.25 would be pretty close to the actual market, although it is something of a favor to get Steel at any price.

Plates.—The demand for Plates has assumed new life, and mills are again besieged with buyers. We are informed by one leading Eastern mill that they turned down between 12,000 and 15,000 tons of good work within a week, simply because it was impossible for them to handle it. Another accepted something over 7000 tons, and then had to close their books, and this appears to be the condition at all the mills in this territory. Shipyards, bridge works, boiler works, tank builders and others are all crowding in their orders, so that it may be said that extraordinary activity covers all branches that are interested in Plates. Prices are higher, and for prompt deliveries very liberal premiums would be paid on quoted rates, which are about as follows for seaboard or equivalent points: 2.30c. to 2.35c. for ¼-inch and thicker; Shell, 2.40c. to 2.45c.; Flange, 2.60c.; Fire Box, 2.70c.

Structural Material.—For the same reasons as mentioned in the previous paragraph business is exceedingly active. It is a matter of great difficulty to secure deliveries in reasonably prompt time, and, as the volume of business is increasing, prospects of relief in the near future are not encouraging. Prices are firm, quotations nominally as follows, but for shipments during May or June buyers are frequently willing to pay $2 or $3 per ton more money: Angles, 1.63c.; Beams, 15-inch, 1.63c.; Tees, 1.68c.; Zee Bars, 1.68c.; Bulb and Deck Beams, 1.83c.

Bars.—The mills are again rapidly filling up their order books, and prices are, therefore, exceedingly firm. There is more irregularity than usual, because some get special rates for special deliveries, but mimimum prices are about as follows for seaboard or equivalent points: Ordinary Bars, 1.45c. to 1.50c.; Refined Bars, 1.55c. to 1.65c.; Test Bars, 1.70c.; Steel Bars, 1.80c. to 1.90c.

Sheets.—There is all the demand that manufacturers are able to manage, and in some cases more than that. Prices very firm as follows for best makes (Common Sheets two-tenths less): No. 10, 2.60c.; No. 14, 2.70c.; No. 16, 2.80c.; Nos. 18-20, 2.90c.; Nos. 21-24, 3c.; Nos. 26, 27, 3.10c.; No. 28, 3.20c.

Old Material.—The market is very unsettled, but prices are not lower. There is a vast amount of material coming on the market, and consumers have been working hard for lower prices, in which they succeeded temporarily, but holders are again stiffening up and have got back to pretty near the old figures. The following are a fair average of bids and offers for deliveries in buyers' yards: Cast Borings, $10.50 to $10.75; Wrought Turnings, $11.50 to $11.75; Machinery Cast, $13 to $13.50; Old Car Wheels, $15 to $15.50; Heavy Steel Scrap, $13.75 to $14; Steel Rails, $14 to $15; Iron Rails, $18 to $19; No. 1 Railway Scrap, $18 to $19; Iron Axles, $21 to $22; Steel Axles, $16.50 to $17.50.

Henry A. Hitner's Sons, Philadelphia, have purchased from the League Island Navy Yard 1300 tons of old shell. They have also purchased, from the Hudson County Railway Company, Weehawken, N. J., the viaduct and elevated railroad at Weehawken; and from the United Gas Improvement Company, Philadelphia, the gas holder at the Twenty-third and Market street gas works, the weight of which is about 500 tons.

Cleveland.

CLEVELAND, OHIO, May 16, 1899.

Iron Ore.—Between vesselmen who are prone to hold out for the maximum freight carrying rates on the one hand, and strikes which have affected directly or indirectly the handling of Iron Ore at upper and lower lake ports on the other, Ore shippers have been in a decidedly unenviable position during the past week. A disclosure which has caused not a little comment was made by the reports received from dock managers for the interval of time up to and including May 1, and which show that there were on the docks at Lake Erie ports on that date scarcely 2,000,000 tons of Iron Ore, as against more than 3,000,000 tons on the corresponding date in the years 1897 and 1898. The amount of Ore now on the Lake Erie docks seems even more insignificant when it is taken into consideration that much of this Ore has been stored for years and is of depreciated value; indeed, it is doubtful if it would be considered of any great value were it not for the exigencies of the present situation. The acquisition of mine and vessel property by the large corporations continues, the latest evidence being the announcement that the Breen mine, on the Menominee range, has been leased to the Minnesota Iron Company, which means, of course, that its product will go to the Federal Steel Company. The option is for one year, and the life of the lease 30 years. An option on the Emmet mine and other mineral land adjoining the Breen was also made to the Minnesota Company. The Breen has produced two grades of Ore, a non-Bessemer Soft Hematite and a high grade Blue Hematite Bessemer. The Emmet is rich in Bessemer Ore, and also carries a high grade of non-Bessemer. The organization of the Davis Iron Mining Company to develop the Davis mine, 1 mile east of Ironwood, is another indication of greater activity, which may be expected in the Lake Superior region. The only Ore charters reported are at the rates which have prevailed since the opening of navigation, and sales of Ore have been limited to small lots.

Pig Iron.—The sale of about 10,000 tons of Bessemer at $16, Valley furnace, has served to materially strengthen the market generally. Other sales of small lots at the same figure are reported, delivery being specified for the last half of the year. The demand for Iron of all grades continues heavy. The quotations on No. 1 Foundry continue at $15, but sales of No. 2, which has heretofore been quoted at $14.50, have also been made at the $15 rate, so that quotations for both grades have virtually been made uniform.

Finished Material.—The week has been one of considerable activity, and a number of sales have been reported, among the number one of 3000 tons for local consumption. A feature of the week was the sudden advent of a heavy demand for Angles; as a consequence the mills are being well sold up on this material, which has heretofore constituted the easiest phase of the market. Some sales of railway Iron have been made to Coal roads, indicating an increasing activity in this industry. Most applicants for Plate seem to have virtually given up the attempt to secure anything within a reasonable time, and manufacturers are pushing ahead their dates of delivery on all grades of material.

Cincinnati. (*By Telegraph.*)

Office of *The Iron Age*, Fifth and Main streets,
CINCINNATI, May 17, 1899.

A very satisfactory condition viewed from a sellers' standpoint exists in the Pig Iron market just at present. May is showing up with a much better volume of business than April did. Without any bluster or excitement the market is gradually strengthening and rising. Local general foundries have been in the market and are now pretty well covered for the balance of the year. There has been another strong movement in Mill Irons. Low grades of Foundry have also been selling. Quite a lot of Basic Pig has been sold by Cincinnati houses having connections in Northern and Eastern cities. Bessemer is reported strong at the Valley furnaces at $16. Quite a number of general contracts have been made during the week for delivery next January and February. There is every probability that higher prices will come, but it is thought it will be by a gradual process such as is now going on. We quote this week an advance of 25c. all along the line, yet with the exception of Gray Forge and No. 4 Foundry the gain has been the growth of several weeks. In the case of the two exceptions mentioned there has been a flat advance owing to the continued demand. Mill Irons have been rather behind the market, but have just about made up the difference. A further advance of 25c. in Gray Forge within the next ten days is not at all unlikely. Customers are complaining a great deal about the delay in shipments on old orders. Iron for nearby delivery is very scarce, though for the last quarter of the year there is no famine as yet in sight. We quote f.o.b. Cincinnati as follows:

Southern Coke, No. 1	$15.00 to $15.25
Southern Coke, No. 2	14.50 to 14.75
Southern Coke, No. 3	14.00 to 14.25
Southern Coke, No. 1 Soft	15.00 to 15.25
Southern Coke, No. 2 Soft	14.50 to 14.75
Southern Coke, Gray Forge	.... to 13.50
Southern Coke, Mottled	.... to 13.50
Ohio Silvery, No. 1	17.00 to 17.50
Ohio Silvery, No. 2	16.50 to 17.00
Lake Superior Coke, No. 1	16.50 to 16.75
Lake Superior Coke, No. 2	16.00 to 16.25
Car Wheel and Malleable Irons.	
Standard Southern Car Wheel	$15.75 to $16.25
Lake Superior Car Wheel and Malleable	16.50 to 17.00

Plates and Bars.—The market holds its strength and sellers appear satisfied with the situation. Quotations, f.o.b. Cincinnati: Bars, wholesale, 1.60c., with half extras; Bars, retail, 1.75c., with full extras; Bar Angles, 1.75c., wholesale; Plates, 2¼c. for ¼-inch and heavier; Sheets, No. 27, 2.85c.; No. 10, 2.40c.

Old Material.—Business is normal and the market is fairly steady at unchanged figures. Quotations, f.o.b. Cincinnati: No. 1 Wrought Railroad Scrap, $14 to $14.50 per net ton; Cast Scrap, $10.50 gross; Car Wheels, $14 gross; Iron Axles, $18 net; Iron Rails, $16; Steel Rails, $11.

St. Louis. (*By Telegraph.*)

Office of *The Iron Age*, 512 Commercial Building,
ST. LOUIS, May 17, 1899.

Pig Iron.—There is a stiffening in prices, and a rather better inquiry for Foundry Iron. No heavy buying movement has set in, but purchasers for new stock continue to come in. So far as the supply goes no easier state of affairs exists than has obtained in the past. Some of the furnaces selling this market have notified their connections that no new business can be taken for this year's delivery. A few weeks' run has had the effect of cutting down founders' stocks beyond their most liberal estimates, and instances have developed to-day wherein embarrassment has been caused by just such shortage of raw material. There is nothing to warrant a belief that prices will go down, but the facts that despite increased output the visible stocks are sadly reduced justify preparations for higher figures. While we show no change in prices below, the top figures represent the general market, and we quote f.o.b. cars St. Louis:

Southern, No. 1 Foundry	$15.50 to $16.00
Southern, No. 2 Foundry	15.00 to 15.50
Southern, No. 3 Foundry	14.50 to 15.00
No. 1 Soft	15.50 to 16.00
No. 2 Soft	15.00 to 15.50
Gray Forge	14.00 to 14.50
Mottled	13.75 to 14.25

Bar Iron.—Jobbers report an active trade. The Bar Iron agents who represented the various mills in the past offer no quotations, and we can only nominally quote mill shipments at 1.60c., base, for Iron. There can be little doubt surrounding an advance, and while jobbers quote 1.85c., base, full extras, it is a figure which may change within a week.

Rails and Track Supplies.—Roadbed improvement and the reduction of mileage by straightening out curves and grades go on encouragingly. Contractors report good headway on the new lines now being built in nearby States, and crop conditions seem to be favorable for a fair increase on railroad earnings. Track material is in good demand, and shop supplies are being looked after with an eye to improvement. No change in prices is noted, and we quote as follows: Splice Bars, 1.60c. to 1.70c.; Track Bolts, with Square Nuts, 2.60c.; with Hexagon Nuts, 2.75c.; Spikes, 2.20c. to 2.30c.; Iron and Steel Links and Pins, 2.20c. to 2.30c.

Pig Lead.—Prices are stationary, with neither buyer nor seller urging the market. The disposition of refiners is to quietly await a rising market, while brokers seem determined to stock up when lower prices prevail. We quote Soft Missouri at 4.32½c. and Chemical at 4.35c. Lead Ore showed no change, and the ruling price was $26 per 1000 lbs.

Spelter.—Some exceedingly high prices were quoted on 'change, even touching the 7c. mark, but sales have not been conclusively uncovered. The market may be quoted at 6.75c., at which figure buyers can be found to-day. The top price for Ore for week ending May 13 was $51 per ton.

G. W. Weyer, for many years located at 921 North Second street, St. Louis, has secured office No. 503 in the American Central Building. Iron, Steel and Copper products will be handled as heretofore, with the advantage of a more central location.

Birmingham.

BIRMINGHAM, ALA., May 15, 1899.

There was no significance in the demand for Iron the past week, and, on the whole, there was no advance. Some Gray Forge sold at $10.75, and some sold at $10.50. No. 2 Foundry went in a limited way at $11.75, but more went at $11.50. One straight lot of 1000 tons, the holdings of an interest other than furnace interests, a special brand that always commands some premium, was offered at $11.75, and was not sold. But that price and on up to $12.25 was obtained for small lots of No. 2 Foundry. Buyers seem to think when any Iron is offered that it indicates anxiety on the part of sellers, and they come back with a bid under asking price. But few transactions of this kind are successfully concluded. Some export orders were worked, but one cannot obtain details of sales In the present condition of affairs these sales are good pointers to justify the conclusion that home demand is not acute and prices are not "on the bulge." One lot of 250 tons went to Hong Kong, China, via rail to San Francisco, on a "hurry" shipment. The Government is supposed to be the buyer, as no private firm could stand the rail freight to San Francisco, which is greater than the cost of the Iron. Sales can be reported as fair and in advance an appreciable amount over current production. Shipments still continue to be very good, and, so far, exceed current output, for stock in furnace yards is not accumulating a bit. The probability is that this will continue for some time to come on account of sales made for forward delivery. The warrant yards still continue to be depleted, as it is still all outgo with them. The orders from small consumers, it is calculated, will absorb the odds and ends of current accumulations and leave nothing with which to meet any large wants should any materialize. At the meeting of the Pipe works combination nothing leaked out concerning the supplying of their wants, but it is known here that they are bound to come on the market for Iron. When they do their needs added to the current business will create a commotion in the market, and probably boost prices. June is almost invariably a month of dullness in all lines of business, and requirements beyond that month are generally filled then. Many orders will be held for the usual sagging of the market. But as there are no stocks to weight the market this year there will probably be great disappointment at its course. The Empire Iron & Steel Company of New York have commenced the dismantling of the furnaces at Fort Payne for removal to Greensboro, N. C. Two hundred and fifty cars of material, it is estimated, will be removed, including the machinery.

All the preliminaries necessary for the transfer, including the orders of the Chancery Court to the Receivers, of the rolling mills to the Republic Iron & Steel Company have been arranged and formal possession will be had this week. The local officials have not yet been announced, and it is expected that the meeting at Chicago to-day will name them. J. G. Caldwell, as one of the managing directors, will have headquarters at Chicago, and make that city his home. There have been some additional sales of Coal lands, the leading one being made by some Philadelphia parties to the Terrill Coal Company of this district. The sale embraces 3000 acres situated in Jefferson and Shelby counties, and the price paid was $85,000, of which $25,000 was cash. Per acre it

was $28.33. There was another sale of less than 800 acres, owned by local parties, for which about $40,000 was paid, or over $55 per acre. The location and surroundings influenced the price. Then there were other sales, ranging all the way from $10 to $25 per acre, depending upon location and surroundings. Some Ore lands, too, have changed hands, but the deeds are held back and particulars of trades are not attainable.

There is considerable inquiry for mining labor for the new mines being opened, and for some whose output it is in contemplation to increase. In at least one case wages have been advanced to 50c. per ton to attract miners, the others paying 47½c. per ton. The report of the Car Service Association shows that for the month of April the movement was about 3000 cars in excess of corresponding month in 1898, and the report of the Clearing House Association shows an increase of $2,500,000 for same month. These two together show the condition of business, and a glance at it convinces one that a great improvement has been reached.

(*By Telegraph.*)

Another advance of 50c. has occurred, with higher prices expected. Large sales of Basic Iron have been made to-day at $12. Last week's sales were made at $11.50. No. 2 Soft sold freely to-day at $12. No. 2 Foundry sold at $12.25, all for delivery last half of the year. Gray Forge is $11.25. The sharp demand for Basic has advanced that grade beyond relative price. The price now obtained for that grade is the highest ever realized since the Tennessee Company commenced making it. The situation is growing more acute every day. Every fair demand will send prices higher.

The English Iron Trade.

Pig Iron.—A marked revival of the gambling instincts that unsettled trade a couple of months ago has characterized the week's business in Pig Iron, the seat of operations being Glasgow, although indirectly the movement had its origin on the London market. Prices have fluctuated considerably, the end of last week witnessing a sudden rise, while during the last two days prices have fallen off again. The Cleveland market has been disorganized in sympathy with the movement elsewhere, to the serious detriment of legitimate business, but is beginning to recover its normal condition. Rubio has advanced in price on the northeast coast, with the result that Hematite is also dearer. The shipment of Pig Iron from Middlesbrough during the past month has only once previously been exceeded. Indeed, the demand for Pig Iron on Continental account is, owing to the strike of miners in Belgium, unusually heavy. The demand for Iron in the Midlands and in Yorkshire is far in excess of the supply, and makers are totally unable to entertain orders for immediate delivery, except on conditions under which customers have to pay dearly for the privilege. In Barrow Hematite prices have ruled high all the week, and makers are greatly pressed with inquiries from all parts of the kingdom. In Lancashire, where stocks are of a meager description, trading is confined to small quantities, sufficient to provide for immediate needs.

Manufactured Iron and Steel.—An active demand prevails for all descriptions of Finished Material and prices are well maintained. The high price of Pig Iron, coupled with the growing cost of fuel, will tend to force prices up still further, the more so as American competition is being less severely felt as a result of the good business done in that country. Work in our town is plentiful, and orders have been received during the week by the Ebbw Vale, Dowlais, and Crawshay Iron Companies for 20,000 tons of Steel Rails and Sleepers, to be shipped at Newport, for the railway extensions in Rhodesia, and an order for about 14,000 tons of Steel Rails for the New chwang Railway has been placed by the railway directors of the Chinese Government with a Glasgow merchant. The Huddersfield Corporation require a supply of Steel Tramway Rails (girder section), Fish Plates, &c. It is announced that the Bowesfield Steel Works are to be enlarged, and the output of Sheet increased by 200 tons per week. A new company, styled the Mount Vernon Iron & Steel Company, Limited, with a capital of $50,000, were registered in Edinburgh last week.

Engineering and Shipbuilding.—Engineers and shipbuilders are alike exceedingly busy. The former are the recipients of substantial orders which will keep all departments busy, but those of locomotive and marine engineering construction in particular. Shipbuilders, on the other hand, continue to book fair orders for tonnage. The number of vessels launched from the various ship building yards on the Tyne during the month of April was seven, making a total of 37 for the year so far. The Clyde total during the same month was well up to the average, the number of vessels launched having been 23, with an aggregate of 76 for the present year to date.

Comparison of Prices.—The annexed table shows the current prices compared with those of last week and of the corresponding period last year:

	May 5, 1899.	April 28, 1899.	May 6, 1898.
Iron Ore—	s. d.	s. d.	s. d.
Rubio, Middlesbrough	15 6	15 6	15 6
Rubio, Cardiff	14 3	14 3	15 6
Pottery Mine, North Staffordshire	14 6	14 6	12 6
Hematite, West Coast (at mines)	13 6	13 6	11 6
Pig Iron—			
No. 3 Foundry, Middlesbrough	54 3	55 0	40 3
Warrants	54 4½	55 11	40 2
Scotch Warrants, Glasgow	54 1	55 11	46 6
Hematite Warrants, West Coast	63 7	60 8	50 4
Cold Blast (Foundry), South Staffordshire	105 0	100 5	105 0
Welsh Hematite, Cardiff	63 0	64 0	51 0
Manufactured Iron and Steel—	£. s. d.	£. s. d.	£. s. d.
Marked Bars, South Staffordshire	8 10 0	8 10 0	7 10 0
Common Bars, South Staffordshire	7 0 0	7 0 0	6 0 0
Steel Rails, Middlesbrough	5 2 6	5 2 6	4 10 0
Steel Rails, West Coast	4 12 6	4 17 6	4 10 0
Steel Rails, Cardiff	5 0 0	5 0 0	.....
Steel Angles (eng.), Middlesbrough	6 10 0	6 17 6	5 12 6
Steel Angles (eng.), Glasgow	7 0 0	7 0 0	5 12 6
Steel Plates (ship), Middlesbrough	7 2 6	7 2 6	5 15 0
Steel Plates (ship), Glasgow	7 2 6	7 2 6	5 15 0
Tin Plates, Bessemer I.C. Cokes, South Wales	s. d. 12 0	s. d. 12 6	s. d. 10 0

—*Iron and Coal Trades Review*, May 5.

The German Iron Market.

ESSEN, May 2, 1899—The most remarkable feature connected with the Iron and Steel market in Germany, which continues exceptionally favorable and generally satisfactory, is the increased difficulty in procuring the necessary quantities of raw material and intermediate products. This has become a real calamity to a series of works and undertakings. In former reports reference has been made to the scarcity of Billets for the Wire industry, so that plants can only run very irregularly. This has become so bad recently that many Rod mills are running only half time. Aside from the serious loss inflicted upon these works by the reduction of output this state of affairs is dangerous as to the position of labor. There being a scarcity of good men in other industrial districts the workmen are scattering on account of the irregularity of work and the losses of wages incident thereto. In that way the organization of the plants is seriously affected. Many Plate mills and other plants which did not have an adequate supply of Steel and cannot now secure any are similarly affected. The blast furnaces are greatly impaired by the scarcity of Coke, and other lines are adversely influenced by the scarcity of Pig Iron. The Dusseldorf Pig Iron Syndicate alone is about 200,000 tons behind its orders for this year's delivery. The restriction in the output of Pig Iron is chiefly due to the scarcity of Coke, which does not make it possible to blow in additional stacks. The furnaces of Loraine Luxemburg have already bought very considerable quantities of English Coke in spite of the high prices, which reached 21 to 23 marks per ton, c.i.f. Rotterdam. The Rhenish Westphalian furnaces are willing to pay any price for Coke, and they, too, will be forced to make purchases abroad. The allotment of Coke for 1900 is much too small. Many furnaces are short thousands of tons, and they have little prospect of covering.

The position of the Pig Iron market is becoming more acute, so that a real famine may be spoken of, which is sure to continue during the first half of the year of 1900. This will force consumers to purchase large quantities abroad. English Mill Iron, on which the duty is 10 marks per ton, is being bought in large blocks, and in this way the mills are helping themselves to some extent in spite of the high prices. Mill Iron and Pig for Steel purposes has been sold by the syndicate at former prices, but with the provision that if an increase in cost takes place in Coking Coal or in Calcined Spathic Ore the prices contracted for Pig Iron are at once raised. This contingency has happened even now, since the Siegen Ore Syndicate has increased the price for Raw Spathic Ore 1.20 marks per ton, and for Calcined Ore 1.50 marks per ton. Through this cause there has been a retroactive advance of 3 marks per ton on Pig Iron, which will favorably influence the blast furnaces for the first half of 1900, since they fully covered orders before the advance. The nominal syndicate prices are: Siegen Spiegeleisen, 72 to 73 marks; Special Mill Iron, 63 to 65 marks; Iron for Steel purposes, 65 to 67 marks; Ordinary Mill Iron, 60 to 61 marks; Bessemer Pig, 70 to 71 marks; Luxemburg Pig for Basic and Mill purposes, 56 marks, f.o.b. Luxemburg; No. 1 Foundry Iron, 74 marks; No. 3 Foundry Iron, 69 to 70 marks.

So far as Foundry Iron is concerned the syndicate has sold out, and the dealers who months ago covered large quantities are selling at much higher prices, taking advantage of the necessities of consumers.

In the Ore market scarcity is observable to some extent. Calcined Spathic Ore is sold to April 1, 1900. For sales beyond that point the price has been advanced 1.50 marks per ton, as stated above. Red Iron Ore is selling at from 11 to 11.50 marks, according to quality.

England, which is receding more and more, so far as its supplies of Ore are concerned and which cannot obtain former quantities from the Bilbao district, is ordering increasing quantities in Sweden. Swedish Iron Ore miners demand that contracts running over several years be closed at the present high prices, which, on an average, are 19 marks per ton, f.o.b. furnace, while Spanish Ores sell at about 17 marks. The latter as well as the Algerian Ores are closed out for long periods. Puddle Cinder has increased in price to 18 marks, f.o.b. furnace, for good Phosphoric.

The market in Steel is very quiet now since everything has been sold out for this year's delivery, and since the syndicate has decided in view of the uncertainty as to prices of Coal and Pig Iron not to make any sales for next year as yet. The syndicate has recently succeeded in squeezing out for the Rod mills a little block of 2000 tons of Billets, for which the price was 100 marks per ton. Muck Bars remain scarce and are hardly obtainable. This condition of affairs will grow worse as the warm season approaches, and will seriously affect the Merchant Pipe mills who depend upon Iron Skelp as their raw material.

Old Material is actively inquired for, while the supply remains moderate. Prices in consequence have increased further. Delivered at rolling mill the prices are: Cast Scrap, 68 to 78 marks; Open Hearth Scrap, 63 to 65 marks; Ordinary Iron Scrap, 73 to 74 marks; Heavy Fresh Melting Scrap, 75 to 76 marks; Rerolling Scrap, 79 to 80 marks; Old Iron Rails, good brands, 94 to 95 marks.

In the market for rolling mill products the enormous pressure still continues undiminished, as though the demand could not be exhausted. All indications point to the fact that this year it is more and more a question of prompt delivery than of prices, which are a minor consideration. Quotations for Iron Bars of good quality have risen to 170 marks per ton; Angles, 185 marks; Steel Bars and Light Shapes as high as 150 marks.

For months to come there is good work in Bands and Hoops, and for any new contracts the new prices of 152.50 to 155 marks are easily obtained Deliveries of 10 to 12 weeks are the regular toing. The extension of the Plate Syndicate seems finally secured after long negotiations. The works have reached an agreement on all but a few questions. At the session held yesterday the base price was raised 10 marks per ton, and the prices are now 160 marks for Ordinary Quality, 170 marks for Structural Plates, 185 marks, base, for Open Hearth Boiler Plates, f.o.b. Essen, Siegen, Koenigshuette or Dillingen. The Plate mills are overwhelmed with work, and further large quantities are in sight for shipbuilding. It has been decided, however, to hold back on any new sales for long time delivery.

The Sheet mills, which for a long time worked under decidedly unfavorable prices, chiefly because they could not agree, have reached the conclusion not to sell under 170 marks, and not to contract for anything beyond December 31, 1899. The Iron Pipe mills are in serious trouble over the supply of Scrap, and are therefore not in a position to avail themselves fully of the amount of work in hand and of the good prices. It is feared that the scarcity of material may force the closing down of plants, since the necessary quantities are simply not to be had.

With the opening of the building season there is a good deal of work for the Beam mills. Prices which officially are still 108 marks per ton, f.o.b. Burbach, have risen since. The syndicate has sold at 110 marks per ton. The Rod mills in view of the scarcity of material are very slow to close further orders. The syndicate price is 130 to 133 marks, according to quantity. Export orders are sold at 8 to 10 marks less. In the Wire Nail market the demand has also increased. The home market may be pronounced very active, and some larger orders have also come from abroad. The negotiations relating to an international regulation of sales in Wire Rods and Wire Nails are being continued.

There has been no change in Railroad Material. The works are heavily engaged, and can pay only moderate attention to export. The street railroads continue to place more orders than can be carried out. The prices for Light Rails, which had lagged, have recently increased. Mine Rails are selling at 117.50 to 120 marks; Rails for narrow gauge tracks, 120 to 125 marks; Standard Rails, 125 to 130 marks, and Street Girder Rails, 147.50 to 152.50 marks.

The plants producing Screws, Rivets and kindred articles are very well employed. In spite of the fact that consderable additions have been made to existing works, and that several new factories have been built, it is almost impossible to cover the enormous demand. Aside from the large inquiries for this character of material through the additions to the navy, the machine industry is bringing out heavy requirements. Then the building trades are active, and, last but least, the demand on the part of the railroads is large.

The foundries and malleable iron works have a good deal of work. Plants producing Sickles, Plow Shares, Shovels, &c., are actively employed, but it is probable that as the season advances business will be quieter in these branches. The construction shops, bridge building plants, locomotive works, &c., are employed for a long time to come, and are making good profits. Car works are well employed until the fall, and will soon receive additional orders for Cars for the winter months. The good demand for Cast Iron Pipe has kept up, and will probably continue during the current year, since all the foundries are still employed heavily and have orders on hand for all sizes well into the fall. Stocks have disappeared altogether.

At this moment a telegram has been received from Gleiwitz, according to which the United Rolling Mills of Upper Silesia have decided to-day not to sell what quantities are still available for the market for the third quarter at an advance of less than 15 marks per ton. The plan of making a further advance was abandoned, the hope being that the moderation shown in raising prices would tend to prolonged stability.

New York.

Office of *The Iron Age*, 232-238 William street,
NEW YORK, May 17, 1899.

Pig Iron.—There is a moderate purchasing movement on the part of consumers and there have been further sales of warrants. On Friday last 1000 tons of Alabama Gray Forge were sold at $10.50, 900 tons of No. 4 at the same price, and 100 tons of No. 3 at $11.⅛. Reports have been current during the past four days relative to a merger of the Thomas Iron Company and the Empire Iron and Steel Company. No serious proposition has yet been made. The monthly directors' meeting of the former company takes place to-morrow. The market continues very strong. We quote as follows: Lehigh and Schuylkill Irons, No. 1 Foundry, $16.50 to $16.75; No. 2 X, $15.75 to $16; No. 2 Soft, $15.25 to $15.50; No. 2 Plain, $15.25 to $15.50, and Gray Forge, $15 to $15.25. Southern brands are quoted: No. 1 Foundry, $15.75 to $16.25; No. 2 Foundry, $15.25 to $15.75; No. 1 Soft, $15.25 to $15.50; No. 2, $15 to $15.25, and Gray Forge, $14 to $14.50.

Cast Iron Pipe.—The shops continue very busy, although the quantity of orders coming out through public lettings is small. The last in this vicinity was for a lot of about 800 tons for Newark, N. J., which went to the United States Cast Iron Pipe Company at $23.20 per gross ton, delivered. Rumors that the Warren Foundry was about to join the consolidation have no basis in fact.

Steel Rails. — Only small lots are being sold at $26 to $27, the mills being too heavily engaged. For Standard Sections, in large lots, the nominal quotation remains $25 at Eastern mill. There is an inquiry in the market for 2000 tons of Girder Rails, but it is difficult to place.

Track Fastenings.— We quote: Angle Bars, 1.35c. to 1.40c.; Spikes, 1.70c. to 1.80c., and Bolts and Nuts, 2.10c. to 2.20c.

Finished Material. — Only moderate contracts were placed this week. The market, however, remains strong. There is a continuance of export inquiry, but little attention is paid to this branch. We quote as follows: Beams, 1.63c. to 1.75c.; Angles, 1.55c. to 1.60c.; Universal Mill Plates, 2c. to 2.15c.; Tees, 1.70c. to 1.75c.; Channels, 1.63c. to 1.75c. Steel Plates are 2.20c. to 2.25c. for Tank, 2.30c. to 2.40c. for Shell, 2.45c. to 2.50c. for Flange, 2.55c. to 2.60c. for Fire Box and 2.60c. to 2.75c. for Locomotive Fire Box, on dock. Refined Bars are 1.50c. to 1.60c., and Common Bars are 1.40c. to 1.50c., on dock. Soft Steel Bars, 1.50c. to 1.55c.; Steel Axles, 2c. to 2.10c.; Scrap Axles, 1.90c. to 2c.; Links and Pins, 1.65c. to 1.70c.; Hoops, 1.95c. at mill; Best Iron Boiler Rivets, 2.25c. to 2.50c., delivered; Steel Structural Rivets, 1.85c. to 1.90c.; Cotton Ties, 95c. a bundle at mill.

Metal Market.

Office of *The Iron Age*, 232-238 William street,
NEW YORK, May 17, 1899.

Pig Tin. — The price since last week has advanced somewhat under the influence of higher London cables, but the business was quiet and transactions very few. This market is not following London in its speculative movements. At the close to-day the market was quoted here 25.65c. to 25.75c. The London market advanced from £115 10s., which was the closing figure last week, to £117 15s., which was the spot closing to-day, and £118 7s. 6d. to-day's future price.

QUOTATIONS OF IRON STOCKS DURING THE WEEK ENDING MAY 17, 1899.

Cap'l Issued.		Sales.	Thursday.	Friday.	Saturday.	Monday.	Tuesday.	Wednesday
$47,100,000	Am. S. & W., Common	117,795	65⅛-67⅛	64 -66¼	53¼-62¼	61 -62⅛	61⅝-64	64 -65⅞
38,150,000	Am. S. & W., Pref. (7 % Cu.)	9,100	97 -98¼	96⅛-97⅛	93 -98	95 -97	96¼-97¼	97 -97⅛
9,250,000	Col. Fuel and Iron	15,515	45¾-47⅞	46 -48	39⅛-44	43 -44	44 -46⅛	45¾-49¼
46,484,300	Federal Steel, Common	202,270	62½-64⅛	61¼-63¼	50 -58	55½-58	56 -57⅞	57¾-62
52,253,500	Federal Steel, Pref. (6% Non-Cu.)	60,200	81¾-83¼	81 -82⅛	72½-78¼	77½-78¾	78⅛-79⅞	80 -83¼
20,000,000	Tennessee Coal and Iron	42,420	57⅛-60¾	57⅛-59¼	55 -58½	54 -57	54⅛-57	57 -59
.....	Cambria Iron, Phila*	1,129	-44	44 -44¾	.....	-44¾	44¾-44¾	-45
.....	Cambria, Steel***	30,535	18⅝-19	19 -19⅝	17¼-17⅞	18⅝-19¼	18⅝-19¼	19⅛-21¾
5,000,000	Penna. Common, Phila	705	-76	78 -79	-79⅛	.....	-82	80 -82
1,500,000	Penna. Pref., Phila	500	.....	.....	.....	.....	.....	-85
28,000,000	Tin Plate Common, New York	11,130	41⅛-43½	41 -42¼	38 -40	39¼-40⅛	40 -40⅝	-40¼
18,000,000	Tin Plate Pref., N. Y. (7 % Cu.)	3,300	86⅓-87½	-87	.....	84¾-86	84¼-84¾	83⅛-85¼
28,000,000	Tin Plate Com., Chic	4,680	41¾-42⅝	41 -42	39⅛-40¾	39⅛-40	40 -40⅜	40 -41
18,000,000	Tin Plate Pref., Chic. (7 % Cu.)	5,536	86 -86⅛	86½-87	83½-87	84 -86	84¼-84¾	84 -85¼
32,000,000	National Steel Common, Chic.	17,430	51¾-54	51¼-53⅛	48 -50⅛	50 -51	50 -51⅛	50 -51½
27,000,000	National Steel Pref., Chic. (7 % Cu)	6,232	87½-88	88 -88¼	85 -87½	85 -86¼	85¾-87	87 -88
32,000,000	National Steel, Common, N. Y.	40,275	51⅞-53⅞	51⅛-53¼	48⅛-50⅜	50 -51½	50 -51⅛	52¾-53
27,000,000	Nat'l Steel, Pref., N. Y. (7 % Cu.)	4,842	-89⅞	87¾-89	88 -89	85 -87	85¾-86⅛	87 -89⅛
7,500,000	Bethlehem Iron**	750	-104	-104	103¾-104	.....	-101	102 -104
.....	Bethlehem Steel Rights	3,460	-23	22¼-23	22 -22¼	21⅝-21⅝	21½-22	-23
12,500,000	Pressed Steel, Common	4,830	52¼-55	-53	-52	-52	52 -54	53 -54
12,500,000	Pressed Steel, Pref. (7 % Non-Cu.)	2,288	-82	-81¾	.....	79½-80	79¼-80½	79¼-80¾
19,000,000	Am. Steel Hoop, Common	19,420	32¾-37¼	29¾-33	29 -30¼	30 -32¾	31 -32¼	32 -33¾
14,000,000	Am. Steel Hoop, Pref. (7 % Cu.)	11,415	76⅞-79	72 -76	-70	70⅛-75	71 -72⅛	73⅝-76

* Par $50. ** 6 % guaranteed by B. S. Co. *** $1.50 per share paid in. Late Philadelphia and Chicago sales by telegraph.

Bonded Indebtedness: Am. S. & W., $730,000; Am. Tin Plate, none; Am. Steel Hoop, none; Federal Steel Co., $13,200,000 Illinois 5 %, $7,417,000 E. J. E. R. R. 5 %, $1,600,000 Johnson 6 %, $6,732,000 D. & I. R. R. 5 %, $1,000,000 2d D. & I. R. R. 6 %, $10,000 land grant D. & I. R. R. 5 %; National Steel, $3,561,000 6 %; Tennessee C., I. & R. R. Co., $8 367,000 6 %, $1,114,000 7 %, $1,000,000 7 % cu. pref.; Pennsylvania Steel: $1,000,000, Steelton 1st; $2,000,000 Sparrow's Point 1st, $4,000 000 consolidated, both plants; Bethlehem Iron, $1,351,000.

Copper. — There has been no change in this market, and business throughout the week under review has been about as dull as possible. Consumers state that they do not intend to buy until they are forced to, and while present conditions last will only buy from hand to mouth. The quotation for Lake remains nominally at 19c. for spot, while three months' futures are nominally 18½c. Electrolytic Cakes, Wire Bars and Ingots are quoted at 17¾c., and Casting 17½c. The London market fluctuated a little, advancing to £79 for spot yesterday. To-day's closing price for spot was £78 5s., and three months' futures were £76 10s. The discount on futures has fluctuated between £1½ and £2½. Best Selected comes to-day £½ higher, with £80 10s. as a figure. The European figures for the first half of this month are not favorable. While the stock has decreased the total supply has increased 580 tons. The producers' figures for April, which we print below, have occasioned some surprise. Members of the trade are wondering how it is that the production shows 2000 tons less in April than in March. There was no accident in any of the mines, nor was there a strike, and it is further stated that last year with 12c. Copper the production was 22,909 tons, while this year with Copper at 19c. the production is only 19,954 tons.

Pig Lead.—This metal was firm during the latter portion of last week, and showed a slight buoyant streak, but with the opening of this week the market has slid back again to its dull position, and at the close to-day quoted very quiet with prices at 4.45c. to 4.50c. St. Louis quotes 4.32½c. to 4.35c., and London cables decline to £14 2s. 6d.

Spelter— Is unchanged, with prices steady at 6.75c. to 6.80c. for spot and 6.75c. to 6.85c. for shipments. St. Louis quoted the market during the week from 6.70c. to 7c., but comes at the close to-day lower and easy to 6.55c. to 6.65c. London is unchanged at £28 10s. The Ore market is practically unchanged at $50 per ton, notwithstanding the fact that one lot of high grade was sold $1 higher than this figure last week.

Antimony—Is firm and without change. Hallett's is quoted at 10c., Cookson's 11c.

Nickel.—There is no change, prices for Canadian Nickel ranging from 38c. to 40c. for lots larger than 1000 lbs. and 40c. to 50c. for smaller quantities.

Tin Plate.—There is a good business going through this market. Orders are numerous, but it looks as though the buying was being done in a very careful manner, as no very large lots have been sold. English Plates have advanced again, and this throws more business to the American Tin Plate Company. Prices remain unchanged, and those quoted by the American Tin Plate Company are said to be on a basis of $4.05 to $4.10 for 100-lb. Cokes, New York delivery.

John Stanton reports the Copper production in the United States and of the foreign reporting mines and United States exports as follows, in gross tons of 2240 pounds:

	Reporting mines.	Outside sources.	Total U. S. product.	Product foreign mines.	U. S. exports.
First half 1895	70,612	9,100	79,712	42,484	34,215
Second half 1895	84,885	6,600	91,485	43,674	30,507
Total 1895	155,497	15,700	171,197	86,178	64,722
First half 1896	94,180	7,200	101,380	42,255	58,216
Second half 1896	95,314	7,200	102,514	43,941	67,287
Total 1896	199,494	14,400	203,894	86,196	125,503
First half 1897	103,651	5,000	108,651	44,263	64,870
Second half 1897	100,555	6,900	107,455	44,007	64,340
Total 1897	204,206	11,900	216,106	88,270	129,210
First half 1898	112,687	7,800	120,487	40,880	68,284
Second half 1898	103,535	10,250	113,785	43,674	76,831
Total 1898	216,222	18,050	234,272	84,554	145,115
January, 1899	16,774	1,850	18,624	5,852	9,204
February, 1899	17,899	2,000	19,899	7,399	8,391
March, 1899	19,918	2,000	21,918	8,077	14,414
April, 1899	17,854	2,100	19,954	7,911	7,423

Iron and Industrial Stocks.

The week's course of the market has been one of surprises. Following the decline and recovery which characterized the first half of last week, stocks on Thursday and Friday were comparatively dull and quiet. On Saturday ex-Governor Flower's death the night previous caused the most exciting tumult that Wall Street has seen for nearly 20 years. The purpose of the moment seemed to be to dispose of industrial stocks and prices dropped violently. Toward the close prices were advanced and the market rallied under strong support. This advance has steadily continued and prices are now nearly on a level with those of this day week.

International Silver, Common	16¼ to 19⅝
Mich.-Peninsular Car First 5s	113
Otis Elevator, Common	36
Otis Elevator, Preferred	80
H. R. Worthington, Common	55
H. R. Worthington, Preferred	112
Cramp's Shipyard Stock	80
Pratt & Whitney, Common	3½
Pratt & Whitney, Preferred	38
E. W. Bliss, Common	138
E. W. Bliss, Preferred	125
U. S. Projectile	90
Barney & Smith Car, Common	25
Barney & Smith Car, Preferred	95
Park Steel Co	109
American Car & Foundry Co., Common	25¼
American Car & Foundry Co., Preferred	66½
International Pump, Common	29¼
International Pump, Preferred	69
Republic I. & S., Common	22
Republic I. & S., Preferred	63
Republic Subscription	81
Tidewater Steel	10¼

It is understood that a statement was submitted to the Stock Exchange by the American Steel & Wire Company as to earnings as a preliminary to listing in the regular department. The Wire interests made an estimate of future earnings a part of the statement, and since this was excluded under the rules the application was withdrawn.

The effect upon the other Steel stocks of the pending issue of the Carnegie stocks is widely discussed. The general impression is that this new call for capital, so far as other Steel stock holdings are concerned, has been discounted.

In a formal application to the New York Stock Exchange authorities for the listing of $2,021,000 5 per cent. bonds of the Colorado Fuel & Iron Company, the net

earnings of the company during March, 1899, and for the nine months ending March 31, 1899, are reported as follows:

Net earnings, March, 1899		$92,804.36
Net earnings nine months, July 1, 1898, to March 31, 1899		$790,937.49
Proportion of bond interest and taxes for nine months	$327,465.00	
Sinking fund, nine months	35,000.00	
		362,465.00
Surplus		$428,472.49

The Cambria Steel Company have issued a notice that the June call of $1.50 per share will not be made.

The Park Steel Company have declared a quarterly dividend of 1¾ per cent., payable June 1.

The Solid Steel Casting Company.

The Solid Steel Casting Company is the title of a new concern in Chester, Pa. The works were formerly known as the Eureka Cast Steel Company, but have been idle for several years. Application for a charter has been made, the incorporators being Luther S. Bent, who represents both the Pennsylvania and Maryland Steel Companies in Philadelphia, and is the general purchasing authority for both of them; Edgar C. Felton of Steelton, who is president of the Pennsylvania Steel Company; Frederick W. Wood of Baltimore, president of the Maryland Steel Company; C. Leighton Mahoney, who is said to be a practical steel maker of large experience; Richard Peters, Jr., who has been connected with a number of large and important industries of this character, and Mr. Booth, who is the company's attorney.

The corporation will be known as the Solid Steel Casting Company. The amount of the capitalization has not been settled, but it will be sufficiently large to admit of carrying on the business on an extensive scale. The incorporators will at once start to put the plant in operation. There will be considerable work to do, but the plant can be made ready for turning out castings in a short time.

Mr. Mahoney will have charge of the plant, and will reside in Chester. The work of the big companies who are interested in the plant has been hampered somewhat by their inability to secure steel castings and they will now begin to make their own castings. Among other things the Maryland Steel Company have the contract for building a large dry dock for the Government, involving an expenditure of many hundred thousand dollars. A great tonnage of steel castings is required for this, and in the present state of the trade it has been practically impossible to get these. Both companies do a great deal of structural work, in erecting bridges and buildings, for which steel castings are required, and the Maryland Steel Company operate a large shipbuilding plant at Sparrow's Point, which is now very busy. These two industries alone will furnish work for a large steel foundry. The enterprise is stated to be a personal venture, the two companies named not being interested as such.

The Berwind-White Coal Mining Company, who have coal mines in Center, Clearfield, Jefferson, Cambria and Somerset Counties, and who are one of the largest producers of bituminous coal in the world, on Monday, May 15, notified their employees of an increase in wages to go into effect June 1. Under the new scale the miners will receive 50 cents per ton for pick mining and 25 cents per ton for loading after the puncher type of machine. It is said the advance affects 10,000 men.

The International Association of Iron Molders of North America paid off the striking molders in Providence, Pawtucket, Lowell and Worcester last week at the rate of $5 per week for single men and $7 per week for married men. The molders claim that they will remain out until the association orders them to return to work. The shops in that section are employing non-union men to as great an extent as possible. They are also sending work out to neighboring towns.

A natural gas well drilled last week in the central part of the city of Kokomo, Ind., as a test of abandoned territory was drilled 30 feet deeper a day or two ago, and is now producing 1,000,000 feet of gas a day. At the first drilling there was no gas in sight, and the well was pronounced a failure.

A combination in the engineering trade of Great Britain is reported as making progress on the lines of a trust, and will shortly be completed with a capital of about $50,000,000. The principal firms in this particular branch will be included, and all the shares will be subscribed for by those interested.

The New York Machinery Market.

Office of *The Iron Age*, 232-238 William street,
New York, May 17, 1899.

This market has continued rather quiet throughout the last week. A fair business is reported in ordinary lines, but we have heard of no transaction of especial importance approaching consummation. The tendency toward holding back of large deals seems to have strengthened, and several good sized contracts which have been on the carpet for some time and were expected to have been closed during the last week were held over. We have heard of one fair sized job that went through during the last week in a rather peculiar fashion. The purchasers sent out their list and received bids from various manufacturers and dealers. They then sent out a duplicate list to the same concerns, with the lowest price which they had received on each machine affixed, and asked for another bid. It is needless to state that the original bids were cut wherever possible and that the purchaser bought at a low figure.

The long deliveries which are required on standard tools have thrown a few good export orders out of this market. We have heard from a large German importing house that they were in this market for several large planers of a Western make, and that the nearest delivery they could obtain was December next. The order was not placed here. This condition is doubtless due to a certain extent to the fact that a short time ago large machinery dealers in this section placed unusually large advance orders with the builders of standard tools and they are now receiving the manufacturers' product almost as fast as they turn the machines out. Many of the large European inquiries which are received in this country are for additions to the plants on the other side which must be erected at once. These additions are occasioned principally by the receipt of large orders from the Government, and as the orders have a time limit attached it is imperative that the manufacturers accepting the order equip their factories for the execution of the work immediately. We have heard recently of a large order which was placed with a German manufacturer of railroad trucks. As the railroads in Germany are under the control of the Government the usual time limit was given for the execution of the contract. This required a large addition to the plant of the manufacturers who accepted the order. They inquired in this market for a quantity of standard tools, but the delivery named was so far distant that they were compelled to purchase almost entirely a second hand equipment in Europe. Large orders have come to this country of late through a German house with offices in this city for machinery to be installed in the new plant of the Russian Electric Company, which is being built at Riga, Russia. We understand that among the prime movers in this work are Ludwig Loewe & Co., the large German machinery builders. Other concerns who are said to be building in Riga at present are the Rigaer Maschinenfabrik und Eisengiesserei, the Feilenfabrik Otto Erbe, the Rigaer Metallfabrik Ætna and the Stahlfabrik Salamandra. Work is said to be progressing rapidly on the new factory which the German Niles Company are building in Germany.

In the issue of *The Iron Age* of last week we published an account of the formation of the Gruson Iron Works. This company have opened offices in the Bank of Commerce Building, 31 Nassau street, in charge of Captain Piorkowski, I.G.A. Plans are being formulated and a site is being selected for the erection of a factory for the building of Gruson turrets. It is probable that the plant will be situated at some point along New York Harbor. Considerable heavy machinery will be required in the building of the works.

We understand that Thorpe, Platt & Co., 97 to 103 Cedar street, New York, are purchasing an equipment for forging and finishing 10-inch projectiles. It is said that this equipment is for the British or a European government. No information could be obtained at the office of the company. This concern have, however, been closely identified with an English company who deal directly with the British Government and it is stated in the trade that it is quite probable that it is for the latter company that the material is being secured. It is stated also that ever since the German Government officials have known of the existence of the plant which is operated in this country for forging 10-inch projectiles they have been endeavoring to purchase a similar equipment.

The General Electric Company are adding to their power plant at Schenectady. They have ordered from Westinghouse, Church, Kerr & Co., 26 Cortlandt street, 20 Roney mechanical stokers.

Westinghouse, Church, Kerr & Co. have just been awarded a large contract for steam piping for the General Electric plant at Houston, Texas.

Large purchases of machinery are still being made by the New York Ship Building Company, whose main offices are located at 910 to 923 Witherspoon Building Philadelphia. C. M. Conradson, who was the originator of the

Gisholt lathe, is chief engineer of the company. Mr. Hall is purchasing agent and Henry G. Morse is president.

It is said that the Columbia Automobile Company, Hartford, Conn., are planning the erection of a large addition to their works and are preparing specifications for considerable machinery. This company have been recently formed with $3,000,000 capital and have acquired the automobile plant which was formerly operated by the Pope Mfg. Company. We understand that they purchased some $60,000 worth of machine tools a short time ago.

Specifications are being prepared for another batch of machine tools for the "temporary" machine shops for the Brooklyn Navy Yard. A considerable quantity of machinery has been purchased just in this way to supplant that destroyed in the recent fire and it is hinted that most of the machinery which will eventually be placed in the new shop will be purchased in this manner. Laborers are still at work clearing away the débris of the wrecked machine shop.

Chief Engineer Pigram of the Manhattan Railroad Company is testing pneumatic hammers, drills and riveters with a view of using them entirely for repair work on the elevated structures. It is stated that his plan is to rig up a portable compressor and move it together with the tools to whatever section of the structure may need repairing.

W. W. Tucker, who was connected with the Pratt & Whitney Company for almost 40 years, has severed his connection with that company, and has established a shop at Hartford for building the Trommlitz voting machine. It is said that he has large contracts for building these machines for the Trommlitz Vote Register Company of Denver, Col. Mr. Tucker has been purchasing machinery in this market for equipping his plant.

The Chihuahua & Pacific Railroad, 80 Broadway, have purchased from the Railroad Supply Company, Chicago, 98,000 tie plates, 17,000 rail braces from Thornton Motley & Co. and several tons of frogs from George H. Carey. They have also given an order to the Pullman Palace Car Company for two Pullman coaches.

Paul Roux of the machinery firm of Roux Frères & Cie, Paris, is in this country. Mr. Roux will visit various machinery building plants in this country, and probably make further arrangements for representing American machinery in France. He is stopping at the Fifth Avenue Hotel.

Watson & Stillman, whose factory is on Forty-third street, this city, report a tremendous volume of business in hydraulic machinery. Their shop is booked about four months ahead, and they find it difficult to procure castings fast enough to keep up with their orders. Under ordinary circumstances this concern have been able to keep their stock of jacks up in dozen lots, but this stock is at present almost entirely depleted. They have been forced to make duplicate patterns in order to get their castings out in time. New machinery is constantly being added to the machine shop, and the plant has been added to considerably. They have just booked an unusually large order for hydraulic presses and accumulators for a linoleum plant which is being erected in Philadelphia.

The Prindle Pump Company, 120 Liberty street, have just received a large order for the Missouri Pacific Railroad through the International Steam Pump Company.

A feature at the Electrical Exposition, which is being held at Madison Square Garden, is that the machinery which is on exhibition on the main floor is all running. Heretofore most of the operating machinery has been confined to the basement.

The Niles Tool Works Company have on exhibition at the Electrical show a full line of the Woods elastic polishing wheels and machines with automatic arrangements. They also exhibit a line of pressed steel pulleys made by the American Pulley Company. The exhibit is in charge of F. H. Gottlieb, Consulting Engineer, 38 Dey street.

The Bullock Electric Company include in their exhibit a 28-inch swing by 8-foot bed Dietz Schumacher & Boye engine lathe and a 16-inch shaper built by the Cincinnati Shaper Company. Both these machines are direct connected to motors.

The Prindle Pump Company have numerous of their centrifugal pumps on exhibition, driven by Lundell motors.

The Northern Engineering Company have besides their gravity motor controller a number of generators direct connected and belted to engines built by the Buffalo Forge Company and the Fisher Foundry & Machine Company.

The Buffalo Forge Company have on exhibition a 6 x 6 vertical marine type engine and a 10 x 12 horizontal electric lighting engine running in oil.

The American Engine Company show a new engine in their 50-kilowatt duplex compound direct connected to generator. The engine running at the show has been sold to F. H. Richardson, Newark, N. J.

The Ball & Wood Company show a 300 horse-power automatic cut off engine which has been sold to the New Haven Electric Company.

The Stirling Company have on the floor a Stirling water tube safety boiler. The Cling Surface Mfg. Company show an engine belted to generators, the belt containing their preparation. Among the other exhibitors are the Clayton Air Compressor Works, the A. A. Griffing Iron Company, John A. Roebling's Sons & Co., the Standard Steam Specialty Company, the Union Boiler Tube Cleaner Company and the Jos. Dixon Crucible Company.

The Paris Exposition.

Major Fred. Brackett, secretary of the United States Commission to the Paris Exposition, says: "The work of allotment of space to intending American exhibitors at the Paris Exposition is proceeding as rapidly as possible. Previous to March 4, when the final appropriations were made by Congress the Exhibit Department had no proper basis upon wich to make allotments, although it was, of course, possible to make tentative plans involving some of the largest and most important exhibits. The matter has now reached a stage of progress that is most gratifying. There is a great deal of detail involved in making the assignments, and careful consideration of each applicant's case is required, making the process appear slow to those inexperienced in such work. Experience shows that six months is ample time in which to prepare ordinary exhibits. The larger and important exhibits will require more time, and it is proper to say in this connection that as far as the more elaborate and extraordinary exhibits are concerned agreements have been reached in nearly every instance between the heads of different departments and the intending exhibitor. The Paris Exposition will open April 15, 1900, so we have nearly a year before us in which to complete our work. One year before the World's Fair opened in Chicago, in 1893, not one foot of space had been allotted to exhibitors, and only a few large blocks had been assigned to foreign Governments. While it is true that many applications are on file with the United States Commission from every line of industry, yet, as the American exhibit will, for lack of space and other reasons, be one of selection, it is desirable that the American sections be not only representative of this country, but also represent the largest possible number of producers. Our commercial interests and national pride demand that the United States shall be prominent in this, the most important of all international expositions. There is still time for filing new applications for space, if promptly forwarded to the headquarters of the United States Commission, either in New York or Chicago."

The Engineers' Society of Western Pennsylvania held their regular monthly meeting on Tuesday evening, May 16, at 410 Penn avenue, Pittsburgh. A paper was presented by A. P. Kirtland entitled "Pittsburgh with Its Black Diamonds." The chemical section of the society will meet Thursday evening, May 18. Samuel Peters of the Pittsburgh Reduction Company of New Kensington, Pa., will read a paper on "Suggested Improvements in the Manufacture of Wrought Iron."

The report that F. H. Buhl of Sharon, Pa., will purchase and put in operation the Wheatland Rolling Mill at Wheatland, Pa., is denied by Mr. Buhl.

The Franklin Furnace, Oneida County, N. Y., is being put into shape to run and will be operated by and the product sold by M. A. Hanna & Co., Cleveland, Ohio, who will also handle the product of the new furnace now being finished at Buffalo and which expects to start up early next month.

Offices have been established in the Bank of Commerce Building, 31 Nassau street, New York, by the Gruson Iron Works. Plans are being perfected and a site is being selected for the works of the company, which will doubtless be built at some point on New York Harbor. P. H. Griffin of the P. Griffin Machine Works, Buffalo, was chosen as president and A. E. Piorkowski, captain I. G. A., was elected secretary of the company.

The New Philadelphia Iron & Steel Company, New Philadelphia, Ohio, report recent heavy shipments of Corrugated Painted Sheet Steel to Japan through San Francisco. Two carloads of Galvanized and Black Sheet Steel were shipped last month to Cuba, and the same quantity was forwarded to Mexican ports. Both these orders were secured through James Coe & Co. of Newark, N. J. A carload of Black Sheet Steel went last week to Melbourne, Australia, the order for which came through New York City exporters. Over 50,000 feet of patent nested Stove Pipe were shipped to Mexico lately by the company and several hundred feet were also forwarded to South Africa.

A Promoter's Argument.

The meeting of the National Association of Stove Manufacturers at Cincinnati last week was seized by J. W. Baker of Philadelphia to present a plan for the consolidation of the stove makers. As a good example of the line of argument put forward we print below Mr. Baker's address:

I think on the start I ought to say to you I am not here as the representative of any syndicate or any underwriters. I am here for the purpose of submitting to you a plan of consolidation which if you adopt you will receive the full benefits of yourselves. I think the time is past when manufacturers are disposed to turn their property over to syndicates already formed for the purpose of getting all the profits in that consolidation. I, however, can assure you if you undertake to consolidate under my management that I have behind me all the capital that is necessary and essential to carry it through. I want to say further that so far as my services are concerned they are given to you without compensation. Of course if it goes through I make my profit through the underwriters—those to whom I turn the business over and who furnish the money, and they usually divide with the party who promotes the scheme. So far as I am individually concerned I give my services without any cost whatever to stove men if they adopt my plan of consolidation. In all consolidations that are successful it depends wholly and entirely upon the economies that can be exercised in that consolidation. If you can exercise a large amount of legitimate economies there is no trouble whatever in obtaining all the capital you require. If you consolidate solely for the purpose of putting the price of goods up you cannot raise a dollar on it. I find here from the information that I have received from some of the manufacturers that the stove business presents more actual economies in consolidation than any business that I have seen. It is perfectly surprising to me the amount of money you actually spend in order to get your goods on the market and in the hands of consumers. There are several very singular things about your business—one is you apparently have an invested capital of $40,000,000 and your annual sales are only $35,000,000. In most businesses, as you gentlemen know, on a $40,000,000 capital the sales should run from $80,000,000 to $100,000,000. It shows you have too much capital for the business to start with. I also find that the average cost of selling goods is about 30 per cent. Some say it is more than that. One of the most conservative men in the business—if I should name him you would all say he was very cautious in his business—made an examination of his business and he found it cost him 26 per cent. Thirty per cent. to sell $35,000,000 worth is $10,500,000. Just think of it! Six per cent. interest on $140,000,000. Then I have been told you pay 3 per cent. on freights getting your goods to some distributing point. Three per cent. does not look very large, but it is $1,050,000 on the business. Then you take your office expenses, allowing them to be 5 per cent., which I think would be conservative, and that is another $1,750,000. Now I do not know what you pay on patterns, but I understand that it runs all the way from 5 to 8 per cent. At 5 per cent. that is another $1,750,000, and out of that $1,750,000 there is probably $50,000 that goes to the betterment of the stoves. If these are facts, and they are as near facts as I can get, that makes the entire expense of selling $35,000,000 worth of stoves over $15,000,000; that is without allowing anything to the retailer. There would be $15,000,000 of substantial economies, and yet I have not touched on the largest economy of them all yet. I understand that the cost of manufacturing stoves in proportion to the selling price is about 40 per cent., which on $35,000,000 would be $14,000,000 that it costs you to make stoves and put them in your warehouse. All who know anything about manufacturing know that when you put into one foundry or one plant $1,000,000 and work it up to its full capacity on the character of goods best adapted for that plant to make there is a saving all the way from 20 to 40 per cent. Twenty per cent. on $14,000,000 is $2,800,000 alone. That would bring it up (I am almost ashamed to tell these figures) to over $19,000,000. If you had $50,000,000 invested in the stove business on 6 per cent. preferred stock, which there is no trouble about placing where the showing is satisfactory and where the economies are all right, your fixed charges against that would be $3,000,000. Then we will allow for your office expenses of the parent company, if you form one, $1,500,000. That is $4,500,000 that is to be deducted, and which brings you back to $15,000,000. Very hard to believe. If this is a fact, or anything like a fact, you can issue preferred stock to the full extent of your investment, that is what you have represented in plant and quick capital. I think I can state to you I could get an underwriter who would underwrite that providing you would take 40 per cent. Say in that case you would get 60 per cent. in money and 40 per cent. in preferred stock in payment for your properties. In addition to that you would naturally issue in the way of good will at least two shares of common stock for every one of the preferred stock. That is what you vulgarly term "velvet;" you get that as part of the inducement, and that would be issued upon the basis that shows from the economies over 15 per cent. dividend. Of course, I do not know that these figures are actually correct, but they are approximately so, and I think they are so near that you can safely say that is a fair approximation of the whole thing. The way to do this is to appoint a committee who will verify these statements. In other words, the committee will ascertain what the actual economies in the business will be if you consolidate. In the meantime I take an option for cash on your property. The option is for cash only. It is given with the understanding that no disclosure is made by me to any one what those options are. They are filed away, and when there are enough in to have a second meeting they are tabulated and numbers are used in place of names. That is for the purpose of knowing what amount of money is actually required to purchase these properties. A man giving his cash option does not agree to go into the company, he simply agrees if you will pay him that money within a given time to accept it for his property for cash. When we have a second meeting, the committee having reported on what the economies are, at that time we would have an underwriter make a proposition, and the proposition would be probably about as I have stated here—that they would underwrite the preferred stock, providing you take one-third of it, or 40 per cent.

Of course the underwriters do not want to go in the stove business. They want you to conduct and manage it. They will expect you to put the best men you have in the business at the head of that concern. When they sell that stock to their customers they want to know that it is on a sound basis. Under these economies there is no trouble getting this money, and there would be no trouble whatever of issuing two shares of common stock to one share of preferred stock. As I stated to you at the start, I will give my services without any cost whatever. If the matter goes through I will make my money through the underwriters. They will give me a fair share of it, but of course in taking it up you folks determine the questions entirely for yourselves what amount of common stock you will issue, receiving the full and absolute benefits of it, with the single exception of what you pay the underwriter. I would naturally expect you gentlemen to pay the expenses of your committee. That would be a very small affair, of course. We do this work without any cost, but we have to send men out sometimes to get these options, and they have to pay their hotel bills, traveling expenses and for some printed matter, so that if you gentlemen should appoint a committee you should be willing to make a contribution that would not exceed $25 at the outset, and which would be paid back to you by the parent company. If we fail and the consolidation does not go through, you would not be exactly $25 out, because you would have the statement of affairs at your back which would be useful to you. You would know what the full capital in the business was and what the real economies were. There is no doubt, however, that where there are such decided economies as there are in this business the thing would go through, and very quickly too.

I would like to say this, that there is considerable notoriety about what is called "trusts." This is not a trust. You do not go into it for the purpose of raising the price of goods, you go into it for the sake of exercising economies. At the present time there is no trouble in getting capital on industrial securities. Probably you gentlemen know of the copper consolidation that was made in New York the other day. They had very good men at the head of it. They had $75,000,000 which they wanted subscribed. They opened books for subscription and in 24 hours the subscription went over $425,000,000. Of course if you let it go any great length of time we don't know what changes may take place; it may become pretty hard to get money on industrial securities. It is not so now. If we had a committee appointed that committee would meet while we are here in Cincinnati. We could formulate a plan, so that I could go home and send out papers and prospectuses, and I think we could wind this thing up in 90 days. I believe that, gentlemen, is the substance of what I want to say to you. I might say that I think this could be underwritten at 97½.

The National Steel Company have purchased the property of the Ohio Iron Company, including the Zanesville furnaces at Zanesville, Ohio. The National Steel Company have also started on the erection of three modern blast furnaces.

MANUFACTURING.

Iron and Steel.

The Champion Rivet Company of Cleveland, Ohio, manufacturers of the Victor boiler rivets, are now located in their new plant in Newburgh. The new plant is equipped with an entire new outfit of power and machinery, rivet making machines, consisting of solid die machines, cpld and hot heading machines, cutting off machines, &c., made especially for the company's work under their own patents. The fuel used is fuel oil. The company are owned and managed by Wilson B. Chisholm, vice-president and general manager of the Cleveland Rolling Mill Company; Edward S. Page, secretary of the Cleveland Rolling Mill Company, and David J. Champion, connected with the Cleveland Rolling Mill Company. The company are now manufacturing rivets for the boilers of the new battle ship "Maine," also rivets for the imperial Russian cruisers and Russian battle ship, for all of which the Wm. Cramp & Sons Ship & Engine Building Company of Philadelphia are under contract, the boilers being built by the Stirling Company of Barberton, Ohio.

The Atlantic Works, at Sharon, Pa., formerly operated by the P. L. Kimberly Company, but which were taken over by the American Steel Hoop Company, have been closed down for an indefinite period. The raw material about the plant has been shipped to Greenville Rolling Mill, at Greenville, Pa., also taken over by the American Steel Hoop Company. Both of these plants were at one time operated by the Atlantic Iron & Steel Company.

The works of the Pennsylvania Steel Company, at Steelton, Pa., are being operated in every department to utmost capacity and the concern are considerably behind in their orders. The pay rolls for the month ending April 30 give the names of 6368 employees.

The employees of the Benwood blast furnace of the Wheeling Steel & Iron Company, at Martin's Ferry, Ohio, have received an advance in wages of 10 per cent., dating from May 15. This is the second raise of 10 per cent. since the first of the year.

The Empire Iron & Steel Company, which concern have recently secured a number of blast furnace plants in the Middle States, last week bought the Victoria Furnace at Goshen, W. Va. The stack is 75 x 17, was built in 1882-1883, first put in blast May 1, 1883, and rebuilt in 1892. It is equipped with three Siemens-Cowper-Cochrane stoves and uses New River coke for fuel and brown hematite ore. The product is foundry and forge pig iron and the annual capacity 50,000 gross tons.

The directors of the J. A. Fay & Egan Company wood working machinery plant at Cincinnati, Ohio, at their last meeting decided to pay a 1¾ per cent. dividend on the preferred stock of the company and to invest the sum of $50,000 in betterments, mostly for machinery.

The Springfield Foundry Company, Springfield, Ohio, have recently brought out a new 12-inch lathe embodying a number of special features in addition to their regular line. Their plant has just been increased by the addition of a new foundry building, 60 x 115 feet. The general demand for their product, it is stated, is very good, while the demand, both from abroad and domestic, is steadily on the increase. Their operating force has been increased 25 per cent. and they are running 60 hours weekly.

The Illinois Steel Company advanced the wages of their laborers at all their mills 10 per cent. on the 15th inst. This makes the rate 15 cents an hour and is the second advance this year.

The Pittsburgh Steel Foundry Company, recently organized at Pittsburgh, have elected the following officers: Stewart Johnston, president; J. M. Lockhart, vice-president; James J. Donnell, secretary and treasurer. With these officers, Wallace Rowe and William McKelvy form the Board of Directors for the first year.

The Pennsylvania Tube Works of Pittsburgh are equipping their plant with electric motors supplied by the Westinghouse Electric & Mfg. Company. The company have ordered a 375-kilowatt generator and motors of various sizes, aggregating about 2500 horse-power.

Announcement is made that the National Steel Company have bought 110 acres of land adjoining their Bessemer steel plant at Mingo Junction, Ohio. On this property it is proposed to erect two blast furnaces of 500 tons capacity each, a new Bessemer steel plant and finishing mills for sheet bars, sheets and merchant steel bars.

Justice Cox, Jr., of Philadelphia has bought the Bellefonte Iron & Nail Works plant, which, under strong financial backing, is to be put in shape and started up at once.

The furnace of the Mineral Products Company of Bridgeville, N. S., after considerable repairs, went in blast on May 10 and is running on ferromanganese and spiegeleisen from manganese wad ores as found in Albert County, N. B., and manganese ore mined on the premises. The fuel is one-half charcoal and one-half coke. Fritz Gleim is the superintendent.

Joseph Wharton of Philadelphia, Pa., proposes to build at Port Oram, N. J., a modern blast furnace.

A warranty deed conveying to the Republic Iron & Steel Company the plant of the Springfield Iron Company was filed at Springfield, Ill., on Monday, May 15. The consideration named is $200,000.

At the time the National Steel Company were formed by taking over the Bessemer steel plants in the Central West, the Wheeling Steel & Iron Company, Wheeling, remained outside and were not included in the consolidation. This concern have a modern Bessemer steel plant, own their own blast furnaces and have interests in ore properties. Announcement is now made that the concern will commence the erection in a short time of a large tin plate plant and a wrought iron and steel pipe mill. It is also stated that they propose to engage in other lines of manufacture.

The James H. Baker Mfg. Company of 313-315 Ferguson Building, Pittsburgh, have broken ground at Tarentum, Pa., for the building of a forge works. The building will be of brick, with iron frame, and they expect to be ready for operations about August 1. The officers are H. M. Brackenridge president; James H. Baker, vice-president; O. C. Camp, secretary and treasurer, and R. A. Travis, J. D. Wilson and Jno. W. Hemphill, directors.

The statement that the Carnegie Steel Company, Limited, would erect a large number of open hearth furnaces at the Duquesne Steel Works, Duquesne, Pa., is, we are officially advised, untrue. The concentration of the manufacture of open hearth steel will continue at Homestead, as heretofore. This concern recently bought a large lot of ground at Duquesne, adjoining the Duquesne Steel Works, and formerly occupied by the Howard Plate Glass Company, and a good deal of guessing has been done as to what the property will be used for. At present the plans of the company in this direction have not been defined.

Machinery.

The Enterprise Boiler Company of Youngstown, Ohio, manufacturers of boilers, blast furnaces, steel stacks, stand pipes, tanks and heavy plate work, recently shipped one carload of pipe to Beaumont, Texas, and one to Sulphur Mine, La., for irrigating plants that are being constructed by the Connersville Blower Company at these points. The Enterprise Boiler Company are remodeling one large stove and building one new one at the Central furnaces, Cleveland, Ohio. The concern have a great deal of work on hand, but nothing of a special nature.

The Totten & Hogg Iron & Steel Company of Pittsburgh, manufacturers of engines and rolling mill machinery, are building a Garrett rod mill for the Alabama Steel & Wire Company of Birmingham, Ala. They are also building considerable machinery for the new tube mill of the Atlantic Tube Company, which is now being erected at Beaver Falls, Pa.

The business of the St. Louis Steam Power Company, St. Louis, has outgrown their original office suite in the Century Building and they have abandoned it for larger quarters and storerooms at 708 and 710 North Second street. A line of Atlas engines and boilers has been added to the list of manufactures previously handled by this company. Sales of the product of the Atlas engine works have been excellent. The Barnard cooling tower and wheel condenser have been sold to the Missouri Edison Electric Company, 1500 horse-power Stirling boilers have been added to the steam plant of the Lindell Railway Company, St. Louis, and the American Steel Foundry Company, Granite City, Ill., have purchased 700 horse-power Stirling boilers with Stirling chain grates.

The business of the Wagner Electric Mfg. Company, St. Louis, has assumed such extensive proportions that the present factory buildings are being added to. The main building is now seven stories in hight, having a frontage of 78 feet and a depth of 110 feet. At the time it was constructed provision was made in a unique way for the erection of additional stories without possibility of interfering with regular manufacturing operations. This was foreseen by having the columns extended sufficiently beyond the roof line to permit capping them to receive new floor beams and columns. Four stories will be added to the seven now in use and all material will be carried up by an independent elevator at outside of building. The company have also purchased an adjoining lot, 50 x 150 feet, on which will be erected a one-story shipping room with driveway. The walls of this building are also designed for future increase in hight, substantially as in the original construction of the main structure.

The Westinghouse Electric & Mfg. Company of Pittsburgh have received an order from the American Tin Plate Company for considerable electrical machinery for the Shenango Works at New Castle, Pa.

The Bellows Falls Machine Company, Bellows Falls, Vt., have been organized for manufacturing and dealing in machinery. The capital is $50,000 and the incorporators are Simon F. Coy, Wallace White, George B. Wheeler, Howard Parker, Lavent M. Read, James H. Williams and John H. Williams, all of Bellows Falls.

The new plant of the Pittsburgh Machine Tool Company, recently organized at Pittsburgh and to which reference has been made in these columns before, will be located at the corner of Lacock and Darragh streets, Allegheny, Pa. Large lathes,

planers and other tools will be made by the new concern, who will be the only one of the kind in Pittsburgh, Pa., making tools of this description. The company have a capital stock of $250,000 and Frank Moore, president of the Pittsburgh Malleable Iron Company, is president of them.

The Landis Tool Company of Waynesboro, Pa. are to build an 80 x 80 foot two-story addition to their present plant, the order for the structural material having already been placed. The company now employ 100 men and on the completion of the addition will probably increase their force to 150 or more.

Bridges.

The Pennsylvania Railroad Company have awarded a contract to the Structural Iron Company of Baltimore, Md., for the erection of a large warehouse in that city, to occupy the block facing on Front street and extending from Constitution to Monument streets. The structure will be 360 feet long and 70 feet deep, and is to be built of concrete, brick and steel, and will be fire proof. It is to be completed by September 1.

Hardware.

The London Halter Company, London, Ohio, is the name of a corporation recently organized for the purpose of manufacturing two newly patented rope halters. W. M. Jones is president of the company, W. H. Winter vice-president and C. W. Pringle secretary and treasurer. The company advise us that they have just commenced the manufacture of the rope halters and express confidence that the goods will meet the approval of the trade.

The Peters Cartridge Company of Cincinnati, Ohio, report a very liberal demand for their products for immediate delivery, so much so that they are forced to erect additions to their present plant to accommodate new machinery which is now being installed.

The Brinkerhoff Novelty Company, Gibsonburg, Ohio, report business good. A large shipment of their Klondike sample holders was made to Germany on the 1st inst. and other foreign orders are anticipated.

Miscellaneous.

A syndicate of Pittsburgh and Baltimore capitalists have bought 4000 acres of undeveloped coal acreage in the thick seam range lying along the Youghiogheny River between Smithton and Sewickley Creek. The company who made the purchase will be known as the Pittsburgh Standard Coal Company.

The Victor Metals & Foundry Company, Weymouth, Mass., at their annual meeting April 25 elected the following officers: Victor C. Lassen, president; Joseph Hendry, treasurer; Charles J. Sheppard, secretary. The company have decided to put in a complete plant for making screen plates for paper mills. They advise us that their Victor white metal, which, they state, has a tensile strength of 48,000 pounds per square inch, has been found by experts to be sulphuric acid proof and therefore particularly adapted for screen plates, digesters, &c., for the paper trade. The company are now engaged in the making of all the ordnance metal casting for the Government torpedo boat destroyers "Lawrence" and "McDonough."

The Dehner-Wuerpel Mill Building Company, St. Louis, Mo., are actively engaged on general repairs and flour mill construction operations. A new 500-barrel mill is being built in Clinton, Mo., and in this line of the machinery trade prosperity is also presenting itself.

The J. D. Smith Foundry Supply Company, Cincinnati, Ohio, report a steady enlargement of business in their line, and are gratified with the reception accorded the new core compound brought out by them, to which they refer as follows: It is a liquid core mixture requiring no flour, rosin, oil or molasses, and will not smoke, smell, blow nor swell.

The Hill & Griffith Company, Cincinnati, Ohio, manufacturers of foundry supplies, have experienced a steady increase in their output ever since their establishment in business. Their plant is modern and fully equal to any demands that may be put upon it, and has been running full since starting.

The Columbia Gray Iron Company, Columbia City, Pa., have recently brought out some new novelties in gray iron. Some enlargements have been made in their manufacturing facilities, and they report that trade is exceedingly brisk with them. A new pattern shop has also been erected, and other additions are being contemplated. Several large orders from abroad have been received, one to Copenhagen, Denmark, and another to Cape Town, Africa. Their working force has also been increased, and they are at present operating 60 hours per week. One of the principal specialties of the company is the Crescent chemical fire extinguisher.

The Twyford Vehicle Company, with a capital of $1,000,000, were organized in Pittsburgh last week to manufacture automobiles. The company are not yet chartered, but it is claimed that the stock has been subscribed. The company propose to erect a plant for the manufacture of automobiles under inventions of Robert E. Twyford.

The Lebanon Mfg. Company, Lebanon, Pa., have begun work on 200 cars to be built for the P. & R. and the Pennsylvania railway companies, 100 for each. Some of the cars are of the Chicago pattern coal cars, 60,000 pounds capacity, while others are box cars, each of 80,000 pounds capacity. The order was received recently, and will provide carpenters, blacksmiths and machinists to the number of 100 work for about two months. The company are also engaged on a number of minor iron contracts.

La Capital Tramway Company of Buenos Ayres, Argentina, have placed an order with the Berlin Iron Bridge Company of East Berlin, Conn., for a steel water tower, supporting a tank having a capacity of 7000 gallons. This is the fifth order the Berlin Iron Bridge Company have received from this company.

The Kelly & Jones Company of Pittsburgh, with works at Greensburg, Pa., manufacturers of brass goods and pipe fittings, have given their employees an advance of 20 per cent. in wages.

The Pittsburgh Reduction Company are making additions to their plant at Niagara Falls for the manufacture of aluminum. The additions comprise 4000 horse-power to the capacity of the lower works, with new building, electrical machinery, &c. The company also contemplate starting an aluminum plant in Canada in the near future to operate under their Canadian patents.

An important change has been made in the Powers & Robinson Foundry & Machine Company, at Garwood, N. J. C. G. Robinson, formerly vice-president of the company; R. S. Brotherhood, secretary, and H. B. Robinson, chief engineer, have all retired from the business, the interest of both the Robinsons having been bought by A. J. Beckley and that of Mr. Brotherhood having been bought by L. E. Hart. The plant is capitalized at $30,000 and the old name will be retained. James F. Powers, who was president and treasurer of the old concern, is president and chief engineer. He will also act as business manager. Ex-Judge L. E. Hart is vice-president and treasurer and A. J. Beckley secretary.

The Union Switch & Signal Company of Pittsburgh have received an order from the Pennsylvania Railroad for a large lot of signal equipment for use on the New York division of the road. The order includes interlocking signals, electro-pneumatic signals and semaphores, and completes the installation of the New York division of the Pennsylvania.

The Anaconda Brass Foundry Company, St. Louis, have purchased the brass foundry formerly operated by J. W. Garratt & Co. in that city. The new owners will make a specialty of journal bearings for cars and locomotives. The incorporators are Albert Waycott, F. C. Stevens and Thos. Dunn.

Marlin & Co., Incorporated, manufacturers of sheet iron and metal goods, are erecting a new plant on Twenty-second street, Pittsburgh, which when completed will be one of the largest and best equipped of its kind in the country. The building was erected by the Fort Pitts Bridge Company of Pittsburgh and is two stories high, extending 120 feet on Twenty-second street, with a frontage of 160 feet on Smallman street. With the completion of the new plant the firm expect to double their output, and employment will be given to a large number of additional men. The firm are very busy, having enough orders on their books to keep them fully employed for the next three or four months. They are making at present large quantities of ice cans and orders for these are being filled from nearly every State in the Union.

Progress on New War Vessels.

Reports to Chief Naval Constructor Hichborn concerning the progress in the construction of new vessels for the United States Navy now in hand at various yards, have been compiled for the month of April. They show that the battle ship "Kearsarge" is within 10 per cent. of leaving the builder's hands, and the "Kentucky" is only 2 per cent. behind. Both these vessels are being built at Newport News, where the "Illinois," with 65 per cent. of work done, is also under construction. Of the two battle ships at the Cramp yards the "Alabama" is within 18 per cent. of completion, and the "Maine," on which work has just started, has 4 per cent. of work done. The "Wisconsin," at the Union Iron Works, San Francisco, has 67 per cent. to her credit, while the "Ohio," at the same yards, has not been started. One per cent. of work has been done on the "Missouri," sister ship of the "Ohio" and "Maine," at Newport News. The sheathed cruiser "Albany," purchased from Brazil, is four-fifths completed at the Armstrong yards in England. Work has started on three of the four monitors provided for in last year's appropriation bill. Of the 16 torpedo boat destroyers recently provided for, the "Hopkins" and the "Hull," at the Harlan & Hollingsworth Works, Wilmington, Del., are in advance of all the others, with 17 per cent. of work done. The torpedo boat "Dahlgren," at the Bath Iron Works, Maine, is within 4 per cent. of completion. The "Craven," at the same place, is next, with 92 per cent. The other 15 torpedo boats range in progress from 6 per cent. to 75 per cent., with the exception of three on which work has not been begun. The "Chesapeake," the sailing vessel for naval cadets, lacks 22 per cent. of being finished, and the submarine torpedo boat "Plunger," at the Columbian Iron Works, Baltimore, shows 85 per cent. of work completed.

HARDWARE.

Condition of Trade.

THE business situation is not materially changed since our last report. With the advance of the season there is a quickening in the demand and goods in nearly all lines are moving freely. In fact, in many lines there is an increased difficulty in securing the prompt execution of orders. This is the case especially in lines in which Wire is a material and those in Brass and Copper lines. Prices continue steady and strong, and it will be noted below that further advances are announced on some prominent goods. Many manufacturers refer to the annoyance they experience from the freedom with which jobbers are underselling them. So far as the retail trade is concerned the market prices of many goods is now made by distributers rather than by the makers of the goods, and quotations based on manufacturers' prices would not represent the market. It is a comparatively rare thing for jobbers to follow manufacturers promptly to the full extent of advances made, provided they have ample stocks on hand purchased at low prices. The reports of still new consolidations of the interests of manufacturers continue to bewilder the trade and suggest questions as to what the outcome is to be. One subject of careful consideration among conservative merchants is as to the duration of the present high prices for Iron, on which so many of the advances which have taken place are based. While it is not regarded as possible that these prices will be of very long continuance, opinions differ as to how soon a reaction may be expected. Meanwhile the wholesale Hardware merchants are pursuing a conservative policy and are not buying more than necessary of the goods which have been most radically advanced. Retail merchants also are disposed to be careful not to accumulate too large stocks at inflated values. values.

St. Louis.

(By Telegraph.)

The buying movement continues good, and the many voluntary orders coming from distant points for articles known to be scarce in this district shows that similar conditions prevail elsewhere. A matter of interest is the recognition afforded to St. Louis as an export factor. Heavy sales have recently been made to Cuba, Mexico, the Hawaiian Islands and the Northwest. All kinds of merchandise figured in these transactions and distinctly New England goods have been placed by St. Louis agents in the West Indian Islands. All Hardware factories are known to be working to full capacity, and yet have not cleaned up their contracts with the trade. Jobbers have difficulty in satisfying the demand for Lawn Mowers, Scythes and Cradles. Wire Cloth is now quoted at $1.50, and a further rise is imminent. The demand for all Wire Goods is better than usual, and an advance in Wire Nails is looked for. Refrigerators are becoming less plentiful, and makers are apparently unable to fill contracts. Axe manufacturers advise us that they cannot make prompt shipments, and the satisfactory movement of Carpenters' Tools speaks well for the activity of the building trades. Builders' Hardware is doing finely, and better grades are purchased each season. Sheet Steel, plain and galvanized, is moving well and sales would doubtless be larger if mills were more prompt in delivery. Distinctly winter goods, such as Coal Hods, Shovels, Stoves and Pipe, are freely dealt in, and Stove manufacturers are preparing for a heavy business. In some fall lines trade has thus far equaled that of the entire year of 1898. Dealers are shy about ordering a stock of Bicycles. Sales are more generally made from sample lines, and doubtless because of the former cuts in prices which in seasons past caught Hardware dealers in an awkward manner. Wagon material is in good demand, and the scarcity of hardwood has caused considerable reworking of roughed out shapes, of which some jobbers had a good supply. In many instances No. 2 stock has advanced to former prices of the highest grades. Machine and Carriage Bolts, Machine and Wood Screws, are flowing freely into users' hands, and prices on the whole are well maintained.

Chicago.

The Shelf Hardware trade has seldom been more active. The orders received on Monday were of a character to almost overwhelm shipping departments. The demand has been good all this month, and reports from salesmen are of the most encouraging character. The movement of staple goods has improved, Wire Nails and other Wire products being in considerably better request. The demand is heavier also for Tin Plates, not only from the country trade, but from manufacturing consumers, who are drawing on jobbers' stocks for cokes in order to supply their necessities. Wire Cloth, Window Screens and Screen Doors are getting more scarce than ever, the manufacturers being far behind on deliveries and jobbers totally unable to accumulate any stocks. The price of Wire Cloth has been advanced by jobbers in the Northwest to $1.50, but local jobbers continue to quote $1.25, alleging that a change in price would mean nothing, as they have none of it to sell. The Heavy Hardware trade is more active than last week, the demand for Iron and Steel showing a further increase. The Sheet trade is decidedly unsettled, many manufacturers refusing to make quotations.

St. Paul.

FARWELL, OZMUN, KIRK & CO.—Trade conditions continue favorable. There has been a larger demand than expected for seasonable goods during the month, as it was considered that the retail dealers had ordered in advance of their wants more freely than usual, and it was also felt that, owing to the delay in the coming of spring weather and the consequent interference with farm work later on, retail stocks would not need replenishing to the ordinary extent in early May.

This has proved, however, not to be the situation. In one way or other the demand has kept up and the frequency as well as the size of mail orders gives satisfactory evidence of the healthy condition of the trade. We have seldom seen the mail order trade so active and satisfactory as it has been during the past few weeks, and this is specially gratifying in view of the heavy orders that have been taken earlier by the traveling salesmen. Prices are well maintained and there are as few complaints all around as are often heard. The most annoying feature of business, as stated in our last, has been the difficulty of getting goods. This condition has improved in some lines, but not with equal success in all.

Some goods will probably be scarce during the season, or at least for some time, but there is ground for believing that the improvement already noted will continue and that things will steadily get more nearly into their normal condition.

It is very gratifying to note that the advances in prices have aparently not affected the demand. The conclusion, from all the circumstances, seems fairly drawn that the country is prepared for a reasonable advance in prices and that, if not carried too far, advanced prices, under favorable conditions, stimulate rather than hinder trade.

The Pacific Coast freight situation, so ably and fairly treated in *The Iron Age* last August, is still at the front. The Eastern Hardware jobbers and manufacturers have suffered heavily under the tariff rates adopted in the Milwaukee meeting last summer. Some relief has been afforded by an amendment to that tariff which became operative May 1. This amendment not only brings the rates to a more fairly adjustable differential between car lots and less than car lots, but it also greatly improves the classification of goods. Under the old tariff the classification was such that, taken in connection with the excessive tariff rates on small shipments, it was impossible for the Eastern shipper to compete in many lines of goods.

This subject is of vital importance to the retail dealers of the Pacific Coast, and before the controversy is over we believe that they will take an active hand in it, as did the retail merchants of Texas last year. It certainly concerns them deeply to know whether they shall be obliged to buy their goods from the Pacific Coast jobbers, or whether they can have the benefit of the Eastern markets. Eastern jobbers desire a share of their trade and will try to secure it if tariff rates are on a fair footing.

New Orleans.

A. BALDWIN & CO.—The volume of business has been large and satisfactory, although it now shows some signs of a slight falling off as we approach midsummer.

The decided increase in the output of Builders' Hardware is very gratifying, as it is an indication of an improvement in the building line.

Seasonable goods are in greater demand than ordinarily and stocks in this line are being depleted, and owing to the fact that the manufacturers are unable to make prompt deliveries there is a scarcity that is being very seriously felt.

Heavy Hardware is moving freely, although the price on some of the staples has the effect of curtailing the output to a certain extent. When prices in the staple line become abnormal people in this section have a peculiar habit of waiting until a change takes place that will enable them to buy product at a reasonable figure.

Boston.

BIGELOW & DOWSE COMPANY.—Business continues to improve, and the volume is increasing in all lines. Dealers are awaking to the fact that while Steel Billets have advanced over 75 per cent. and the price of labor has been increased from 10 to 20 per cent. there is still a wide margin between the increased cost of the base material and the general line of manufactured Hardware. It is easy to believe that the boom has only commenced. With an advance in Axes of $2.50 per dozen, and orders booked to keep the factories running until next March, and when orders placed now have no hope for being filled until next November, one can judge of the probabilities in many other lines.

The price now is a secondary consideration as compared with the possibility of getting orders filled. The best judges consider that there can be no let up to present conditions until next winter, if it comes even then.

Seasonable goods are scarce, and prices are being advanced. This market is very short of Wire Cloth, which has a quick sale at $1.50 per 100 feet. Stocks of Poultry Netting are light, and orders sent to the factory in January are only now being filled. Screen Doors are at a premium, and Lawn Mowers are hard to get from the factories.

The retailers are having a good business, and are buying freely.

All branches of manufactures in New England are busy, and labor is well employed at advanced wages.

Prosperity has taken the place of adversity.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—Trade continues very active and prices remain firm. The scarcity of season goods still continues, and it is the problem that the jobbers are compelled to contend with, and they stand between the retail merchants and the manufacturers to take all the blame. While manufacturers no doubt have their grievances and own troubles to contend with, the jobber certainly has his hands full to satisfy his trade of the difficulty he has in completing orders on season goods, owing to the fact that manufacturers are so far behind on orders placed with them variously from 60 days to four months ago. With a vigorous effort, however, the trade is being kept fairly well supplied with a prospect of having all orders completed in time for actual wants.

Collections are fair.

Omaha.

LEE-GLASS-ANDREESEN HARDWARE COMPANY.—Business from every point of view has been entirely satisfactory during the first half of May.

The farming communities are still busily engaged in planting crops, yet the movement of merchandise into consuming channels is quite active and all that could be expected.

With the beautiful summerlike weather just inaugurated the spring season seems to be finally in full swing, and many enterprises will now take shape that have been delayed by unpropitious climatic conditions. The usual number of advances in prices keep coming forward in regular fashion, and the general market continues in a very firm position. The generally increased consumption and the confidence felt in the future is a sufficient basis to sustain the market and these conditions appear likely to prevail for some time to come.

Louisville.

W. B. BELKNAP & CO.—The market still continues active, with liberal buying in all classes of goods. The country has got a momentum now that is not going to be headed off in a hurry even by threats of a deluge when the water shall be squeezed out of the great combinations which is being pumped in at such an appalling rate at present.

Instead of reading the "Arabian Nights" now the man who wants ample scope for flights of fancy may indulge in the contemplation of the stories which come from the register's office in the State of New Jersey.

A further advance in Bar Iron is deemed not unlikely as soon as the Republic Company get fairly to work to show what they can do. The advance already from the lowest point is about $16 a ton, but that is a mere inconsiderate trifle in these days of surprises.

The interesting question now is not so much how the Iron and Steel makers are to earn money as to what they are going to do with all of it after they get it, particularly out West here, where the ownership of private yachts does not furnish such a ready outlet of surplus capital as is offered on the seaboard. The man that will invent something to relieve this congestion which would prove at once attractive and exclusive has a large fortune in store for him. Possibly we shall have a score of libraries, parks, fountains and other contributions to the public weal as a result. It would be a happy solution of the matter.

Portland, Oregon.

CORBETT, FAILING & ROBERTSON.—Trade is jogging along in a good old fashioned steady way. Orders are coming in for goods in all lines, showing that our customers have faith in the permanency of at least the present market. There is no speculative buying now, orders being for immediate and nearby needs. We do not now expect any very lively business during the rest of this year. The trade generally have their eye on the crop situation, and at present that is not nearly as favorable as at the same time last year. Yield and price being less in prospect, sales must conform. Our present local interest

is centered in the hight the Columbia River is likely to attain in its annual summer rise, whether only basement is to be submerged or first floor flooded. The season being so backward little snow has melted in the mountains, and the danger is that when warm weather sets in it will be continuous, bringing all the water down at once.

Cleveland.

THE W. BINGHAM COMPANY.—Business so far in May has kept well up in line with the preceding months of this year. Prices are daily advancing on manufactured goods, as makers are obliged from time to time to make new contracts for their raw material. There is a great scarcity of some kinds of Hardware, notably that which comes under the head of season goods, there having been an unprecedented demand for all kinds, and if supply and demand control the price, as they should, there ought to be a large advance on everything of this character. Unfortunately, however, there are dealers who do not seem to take this view of things, and sell their goods at prices based upon cost to them so long as their stocks hold out rather than at the present market value, forgetting entirely that theirs is a theory that will not work both ways, and upon a declining market they cannot do likewise.

Notes on Prices.

Wire Nails.—The market is devoid of special features of novelty. Its strong tone continues with an excellent demand, taxing the ability of the manufacturers to execute orders in all cases as promptly as their customers would wish. There is evidently a liberal movement of business from the wholesale to the retail houses, and indications also point to a steady and growing consumption. Quotations are as before, f.o.b. Pittsburgh:

To jobbers in carload lots	$2.10
To " in less than carload lots	2.12½
To retailers in carload lots	2.20
To " in less than carload lots	2.30

New York.—The demand upon the New York market is increasing in volume and a good many orders for sorting up stocks are being received. The market is represented by the following quotations:

To retailers, carloads on dock	$2.30 to $2.35
To " less than carloads on dock	2.45 to 2.50
Small lots from store	2.55 to 2.60

Chicago.—Manufacturers report a continued good demand at unchanged prices. Single carload lots are quoted at equivalent to $2.35, Chicago. Jobbers have had a considerable increase in their trade and still hold small lots from stock at $2.45, although some cutting is being done by jobbers in other localities.

St. Louis, by Telegraph.—Wire products in general are being quietly dealt in and some houses report sales better than usual. The advances made since January 1 have variously affected the retail trade and not a few kept out of the market because of past experiences. Prices are now maintained by a single factor and the holdovers are gradually coming to market. No change has occurred in prices and we quote carload lots to jobbers at $2.30, base, St. Louis; single cars at $2.40 and small lots at $2.50 from stock.

Pittsburgh.—The Wire Nail market shows no new features since our report of last week. Jobbers report a good volume of business, the retail trade buying Nails very liberally. We understand a very heavy export trade is being done in Wire Nails by the American Steel & Wire Company. We quote: To jobbers in carload lots, $2.10; to jobbers in less than carload lots, $2.12½; to retailers in carload lots, $2.20; to retailers in less than carload lots, $2.30, all f.o.b. Pittsburgh, with freight to destination added. The usual custom is to quote delivered prices. In some cases jobbers are slightly shading above prices.

Cut Nails.—The arrangement between the Eastern mills continues to work smoothly, and quotations are steady, on the basis of the following prices, f.o.b. Pittsburgh, freight being added to destination:

To jobbers in carload lots	$1.75
To " in less than carload lots	1.80
To retailers in carload lots	1.80
To " in less than carload lots	1.95

New York.—There are indications of a slight increase in the proportion of Cut Nails sold as compared with Wire Nails, and business on the whole is in a very satisfactory condition. Quotations are as follows: Carload lots on dock, New York, $1.90 to $1.95; small lots from store, $2.05 to $2.10.

Chicago.—Trade continues of about the same volume, with small lots from store firmly held at $1.90.

St. Louis, by Telegraph.—The demand for Cut Nails is of a regular character, with no change in price. Jobbers quote small lots at $2, base.

Pittsburgh.—There is a fair volume of business in Cut Nails, but not as heavy as anticipated. We quote Cut Nails at $1.65 in carload lots and $1.75 in less than carload lots, f.o b. makers' mill, Wheeling.

Barb Wire.—Indications point to a heavy business during the season. It is not unlikely that something of a scarcity will be developed. The demand is steady, and the mills are fully occupied, finding some difficulty in making reasonably prompt shipments. Quotations continue unchanged, f.o.b. Pittsburgh:

To jobbers in carload lots, Painted	$2.20
" " Galvanized	2.70
" in less than carload lots, Painted	2.22½
" " " " " Galvanized	2.72½
To retailers in carload lots, Painted	2.30
" " Galvanized	2.80
" in less than carload lots, Painted	2.40
" " " " " Galvanized	2.90

Chicago.—The demand from factory is holding up remarkably well, considering the season. Jobbers also report a quite satisfactory trade. Single carload lots are quoted at the equivalent of $2.20, Chicago, for Plain Annealed Wire, $2.45 for Painted Barb Wire and $2.95 for Galvanized Barb Wire. Jobbers' prices for small lots are 10 cents per 100 pounds above carload rates.

St. Louis, by Telegraph.—Trade is encouraging in Wire goods, and Barb Wire is receiving a proper share of the business. Prices are well maintained, and makers quote equal to $2.40, St. Louis, for Painted in carload lots to jobbers. Single cars may be had of jobbers at $2.50, and smaller quantities at $2.60. Galvanized is quoted at an advance of 50 cents per 100 on prices above mentioned.

Pittsburgh.—There is a moderate volume of business in Barb Wire, but it is not as heavy as in Smooth Wire. It is evident that the latter is largely supplanting the former right along. We quote at $2.20 for Painted in carload lots to jobbers and $2.30 to the small trade, with an advance of 50 cents for Galvanized, all f.o.b. Pittsburgh.

Smooth Wire.—The increased uses to which Smooth Wire is being applied have the effect of making a heavy demand upon the mills, and it is evident that the sale of Smooth Wire will this year be considerably in excess of last year, or, indeed, of any previous year in the history of the trade. Quotations are maintained very firmly as follows, terms, f.o.b. Pittsburgh:

To jobbers in carload lots	$1.95
To " in less than carload lots	1.97½
To retailers in carload lots	2.05
To " in less than carload lots	2.15

The charge for galvanizing is 50 cents on sizes from 6 to 14 inclusive; on Nos. 15 and 16 it is 85 cents and on Nos. 17 and 18 $1.10.

Pittsburgh.—There is a heavy demand for Smooth Wire, and it seems to be increasing right along. Tonnage this year promises to be exceptionally large. We quote. Jobbers, $1.95; to smaller trade, carload lots, $2.05, and less than carload lots, $2.15. On Galvanized Plain Wire, all sizes up to and including No. 14, 50 cents advance; Nos. 15 and 16, 85 cents; 17 and 18, $1.10, all f.o.b. Pittsburgh, with freight tariff to destination added.

Chisels and Drawing Knives.—At a meeting of the manufacturers of Chisels and Drawing Knives, which was held in New York on Tuesday, a further advance of 5 per cent. was made in the price of these goods. The market is referred to as fairly even, manufacturers generally maintaining steadily the higher prices agreed upon.

Carriage Bolts, Machine Bolts, &c.—The market on this line is very firm, and nearly all the manufacturers are loaded up with orders. So much so is this the case that there is a good deal of difficulty in obtaining goods as promptly as required by the exigencies of trade. In view of this condition and the radical advances which have taken place in the price of Iron, manufacturers are naturally very firm in their prices, and the large advances which have been made in the prices of Carriage Bolts, Machine Bolts, Lag Screws, Bolt Ends, &c., are quite strictly maintained. There is, however, a good deal of unevenness in the quotations made by the jobbing trade, very few of whom, for example, are holding Common Carriage Bolts at discount 70 per cent., which would be the regular price on the basis of the present cost of the goods.

Iron Rivets.—Under date May 10 a revised list on Iron Rivets and Burrs was adopted by the manufacturers of these goods. The basis of the list remains as before, the changes being especially in tinned and tin plated goods. The revised list is given in full herewith, and is subject to the regular discount of 65 per cent.

Egg Beaters.—The market for Dover pattern and other

Revised List of Iron Rivets.

May 10, 1899.

IRON RIVETS IN BULK.

Price per Pound.

Size.	Length. 1/8	10/32	7/16	12/32	5/8	11/32	6/16	9/32	1/4	7/32	3/16	5/32	1/8	3/32
7/16	15	..	..	..	..	..	..	..	..	..	..	..	..	..
8/8	15	16	..	..	..	..	..	..	..	..	..	..	..	..
11/32	15	16	16	..	..	..	..	..	..	..	..	..	..	..
5/16	15½	16½	16½	16½	16½	..	..	..	..	..	..	..	..	..
1	15½	16½	16½	16½	16½	16½	..	..	..	..	..	..	..	..
2	15½	16½	16½	16½	16½	17	17	..	..	..	..	..	..	..
3	15½	16	17	17	17	17	18	18	18	..	..	..	..	..
¼	15½	16	17	17	17	17	18	18	18	19	19	..	..	..
4	15½	17	17	18	18	18	18	18	18	19	19	20	..	..
5	16	17	18	18	18	18	19	20	20	21	21	22	22	23
6	16	17	18	18	19	19	20	20	21	22	23	23	23	24
3/16	16	17	18	18	19	19	20	20	21	22	23	24	25	26
7	16½	18	18	18	19	19	20	20	21	22	23	24	25	26
8	17	18	19	19	20	20	21	21	22	23	24	25	26	27
9	18	19	20	20	21	21	23	23	23	24	25	27	29	30
10	19	20	21	22	23	25	27	28	28	30	33	35	37	38
11	20	22	24	26	27	28	30	31	31	33	37	40	42	45
12	21	24	26	28	29	30	32	34	35	36	41	45	50	55
13	25	27	30	33	34	35	37	39	40	41	45	50	55	60
14	27	30	35	38	40	45	50	52	55	58	58	60	63	65

Rivets made from smaller Wire than No. 14, all lengths, 70 cents per pound.

Extras.

Tinning, 2½ cents per pound, net.
Tin Plating, 1 cent per pound, net.
Coppering, 1 cent per pound, net.
Shoulder Rivets, 2 cents per pound, added to list.
Packing in 25-pound boxes, 20 cents per 100 pounds, net.
Packing in 10 and 5 pound packages, 30 cents per 100 pounds, net.
Packing in 1-pound packages, 50 cents per 100 pounds, net.

BLOCK AND CARRIAGE RIVETS.

In Papers of 100 Each.—Price per Paper.

Size.	Length. ¾	⅞	1	1⅛	1¼	1½	1¾	2	2¼	2½	3	3½	4
3	32	36	40	44	50	60	68	75	85	98	110	125	150
4	30	32	36	40	46	50	60	68	75	85	100	118	125
5	26	28	30	34	40	48	56	62	68	75	85	100	120
6	22	24	28	32	36	40	46	54	62	70	80	95	110
7	20	22	24	27	30	34	38	42	46	55	65	75	85
8	16	18	20	22	26	30	34	38	44	50	60	68	75

COOPERS' RIVETS.

Price per Pound.

1d	2d	3d	4d	5d	6d
6½	16	15½	15½	15½	15

HAME RIVETS.

Price per Pound.

	6	5/16	7	8
½-inch and longer.	16	16	16½	17

BELT RIVETS AND BURRS.

Price per Pound.—Any Length.

Tinned or Coppered.	7	8	9	10	11	12	13	14
Uniform lengths in 1-pound boxes	31	32	33	34	35	42	43	45
" " " ½-pound boxes	35	35	37	38	39	46	47	49

TINNERS' IRON RIVETS IN PAPERS.

Price per paper of 1000 each.

	Black.	Tin'd.	Tin Plated.
8 ounces	$0 20	$0 25	$0.22
10 "	22	28	25
12 "	24	31	27
14 "	26	35	30
1 pound	27	37	31
1¼ "	29	42	34
1½ "	33	48	39
1¾ "	37	55	44
2 "	42	62	50
2¼ "	55	80	65
3 "	60	90	72
3½ "	70	1.05	84
4 "	76	1.16	92
5 "	90	1.40	1.10
6 "	1.08	1.68	1.32
7 "	1.26	1.97	1.54
8 "	1.44	2.24	1.76
9 "	1.53	2.43	1.89
10 "	1.75	2.75	2.15
12 "	1.98	3.18	2 34
14 "	2.31	3 71	2.87
16 "	2.64	4.24	3.28

Oval or countersunk heads, or extra lengths, 10 cents per 1000 in addition to the above prices.

TINNERS' IRON RIVETS IN BULK.

Price per pound.

	Black.	Tin'd.	Tin Plated.
8 ounces	$0.38	$0.48	$0.42
10 "	34	44	38
12 "	31	41	35
14 "	29	39	33
1 pound	26	36	30
1¼ "	23	33	27
1½ "	22	32	26
1¾ "	21	31	25
2 "	20	30	24
2½ "	20	30	24
3 "	19	29	23
3½ "	19	29	23
4 "	18	28	22
5 Barrel Rivets.	18	28	22
6 Barrel Rivets.	17	27	21
7 Barrel Rivets.	17	27	21
8 Barrel Rivets.	17	27	21
9 Barrel Rivets.	17	27	21
10 Barrel Rivets.	16	26	20
12 "	15½	26	20
14 "	15½	26	20
16 "	15½	26	20

IRON BURRS.

Price per pound.

	Black	Tin'd.	Coppered or Tin Plated.
8/8	$0.28	$0.38	$0.27
11/32	23	33	27
5/16	23	33	27
1	23	33	27
2	23	33	27
3	23	33	27
¼	23	33	27
4	24	34	28
5	25	35	29
6	28	38	32
3/16	28	38	32
7	30	40	34
8	33	43	37
9	34	44	38
10	35	45	39
11	36	46	40
12	42	52	46
13	42	53	46
14	45	55	49

Egg Beaters continues firm, and recent advances are referred to as well maintained. Manufacturers state that prices on these goods have for some time been exceedingly close, and with the advances which have taken place in the raw material the recent advances in the price of the goods are justified. The demand is referred to as excellent.

Chain.—The negotiations between the manufacturers of Coil Chain, Trace Chain, &c., to which we have already referred, are being continued, and it is understood with some prospect that a consolidation of the Chain interests will be effected. Those who are identified with the movement refer to it as on a conservative basis. Meanwhile the Chain market is decidedly firm, and the manufacturers find a good deal of difficulty in turning out goods as fast as they are demanded by the trade. The fact that it is hard to obtain the raw material embarrasses the manufacturers considerably. Pending the negotiations looking to the unifying of Chain interests manufacturers have been refusing to book orders for future delivery. In sympathy with the Iron market and the increased cost of producing the goods a further advance has been made in quotations on Coil Chain, which are now as follows, f.o.b. Pittsburgh:

Inch.	Per 100 pounds.	Inch.	Per 100 pounds.
3 16	$7 10	9-16	$3.35
1-4	5.35	5-8 and 11-16	3.25
5-16	4.35	3-4 and 13-16	3.20
3-8	3.70	7-8 and 15-16	3 10
7-16	3.55	1	3.10
1-2	3 40		

On orders for carload lots the price is 10 cents per 100 pounds less than the above.

American Screw Company.—Under date May 10 American Screw Company, Providence, R. I., issue a revised discount sheet calling attention to changes in discounts for Rivets adopted May 10, and to the changes in discounts on Tire, Sleigh Shoe, Stove and Sink Bolts and Stove Rods adopted March 24. They also send out the revised price-list on Rivets which is published on another page.

Staples.—A further advance has been made by the associated manufacturers of Staples, Poultry Netting, Blind, Clinch, Electricians', &c. The manufacturers' prices on these goods are now as follows:

	Discount. Per cent.
Poultry Netting	85 and 5
Blind	80 and 10
Spring	80 and 10
Clinch	80 and 10
Hook	80 and 10 and 10
Electricians'	80
Wire Cloth, in bulk	80
" " in papers	90 and 5

Pump Chain.—The market for Galvanized Pump Chain continues to advance in sympathy with the raw material. The Chain is quoted at 4½ to 4¾ cents, terms 30 days, or 1 per cent. discount for cash in 10 days, with freight allowance.

Hollow Ware.—Another advance in Stove Hollow Ware is announced. Present prices are as follows, terms 60 days, or 2 per cent. discount for cash in 10 days:

	Discount. Per cent.
Ground	65
Unground	70

Shovels and Spades.—There has been no further change in the association's price for Shovels and Spades, but it is understood that some of the manufacturers are advocating another advance. The market on these goods is decidedly firm and fairly even, the only disturbing feature being the fact that the jobbing trade are in many cases making moderate concessions from the scale of prices, which according to the association's rules they should maintain. There has been, however, perhaps less of this than heretofore. In the New York market, for instance, concessions have until recently been quite frequently made, but under the influence of the local association of jobbing houses and related interests these cut prices have been withdrawn, and it is expected that the full association selling prices will be adhered to.

Snow Shovels.—Many of our readers are familiar with the fact that Snow Shovels, being outside of the combination, have for some time had a large sale instead of the ordinary cheap Shovel, being adapted to many uses to which the latter was put. In order to prevent this competition of Snow Shovels with the regular goods an advance has been made in the price of both Long and D handled Snow Shovels. A radical difference is also made in the prices of the Long and the D-handled goods, the Long-handled Snow Shovels being quoted at $2.50 per dozen and the D-handled at $5 per dozen. The latter, it will be remembered, not long ago sold at $2 per dozen.

Double Pointed Tacks.—A further advance has been made by the manufacturers of Double Pointed Tacks, which are now quoted in small lots at discount 90 and 5 per cent., and in bulk at discount 80 and 10 per cent. It is understood that a good many of the jobbers have still ample stocks of these goods, which are offered at material concessions from the manufacturers' prices.

Paris Green.—Manufacturers' prices on Paris Green are generally on the basis of 12 to 12½ cents in Arsenic kegs or casks, according to quality and customer, while some hold it firm at 13 cents. Jobbers who purchased early in the season are shading the foregoing figures. Orders are being received in fair volume for the season of the year. The following are 30 day net prices:

	Cents per pound.
Arsenic kegs or casks	12 to 13
Kegs of 100 to 175 pounds	12½ to 13¼
Kits of 14, 28 and 56 "	13¼ to 14¼
Paper boxes, 2 to 5 "	13½ to 14¼
" " 1 pound	14 to 15
" " ½ "	15 to 16
" " ¼ "	16 to 17

It should be borne in mind that these quotations are more or less freely shaded by jobbers, who purchased in many cases at prices about 25 per cent. below those now ruling

Glass.—The situation in the Window Glass market is unchanged, except the reduction in output week by week consequent upon warm weather at this season of the year and the closing down of some Window Glass factories as a result of labor difficulties. The time has expired for favored jobbers to be benefited by placing orders at the rebates offered by the associated manufacturers to stimulate trade. Demand at this point is limited and jobbers are still quoting 80 and 20 and 5 per cent. discount in small lots for either single or double strength Glass. Western jobbers have advanced their price to 85 per cent. discount for single, and 85 and 5 per cent. for double strength Glass. The American Window Glass Association's prices are unchanged, as follows:

Districts.	A.	B.	C.	E.
5000 boxes or more	85 & 10	85 & 10	.....	85 & 10
Carloads	85	85	85 & 2½	85
3000 boxes or more	85 & 5	85 & 5	.....	85 & 5 & 2½
1000 boxes or more	.....	.....	85 & 10	.....

These prices are subject to freight allowance.

Paints and Colors.—The improvement in the demand for White Lead in Oil, noticeable last week, continues as the result of consumers putting it in use more liberally. Prices continue without change, as follows: In lots of 500 pounds, 6¼ cents; 500 pounds or over, 5½ to 5¾ cents.

Oils.—*Linseed Oil.*—The anticipations of the Western Oil market recovering in price have not yet been realized. City crushers hold firm at former quotations, business being light and confined to retail lots. Large buyers have supplied themselves at lower prices ruling some time since and are consequently out of the market as purchasers, the market having been well sold up if not oversold. City crushers are quoting Raw Oil at 49 to 50 cents per gallon and Boiled at 51 to 52 cents. Western Oil is 3 to 5 cents less per gallon.

Spirits Turpentine.—Receipts of Turpentine in fair volume from Florida and South Carolina have supplied this point with stocks sufficient for current needs. The stringency being thus relieved, prices have declined and the difference between New York and Savannah values has narrowed down. Demand is confined to jobbing requirements, which are supplied at 41½ cents for Southerns and 42 cents for machine made barrels.

Formation of Local Associations

DISCUSSED BY

New England Hardware Dealers' Association.

THE NEW ENGLAND HARDWARE DEALERS' ASSOCIATION at the May meeting, held at the United States Hotel, Boston, on the 10th inst., after dinner, continued the discussion of the proposed change in the character of the association by the formation of local affiliated associations throughout the New England States.

The guests especially invited for this occasion were R. R. Williams, Hardware editor of *The Iron Age*, and Herbert E. Jennison of Fitchburg, Mass. The musical entertainment was furnished by Miss D. Emily Lucey, Miss Helena F. Jacobs and Leslie F. Mansfield. The members having the entertainment for the evening in charge were Austin H. Decatur, Calvin M. Nichols and James A. Cook. The attendance was large and great interest was shown in the subject under consideration.

The Lowell Association.

At the close of the dinner President William D. Parlin introduced Charles E. Adams of Lowell, Mass., who told of the local association in that city, which has recently been organized after several previous unsuccessful attempts. Mr. Adams said that the Lowell Association is producing gratifying results; all the members are living up to the regulations and are making money. He thought any town where there are two or more dealers should have its local association.

Mr. Adams, who is a member of the commission in charge of the Massachusetts exhibit at the Paris Exposition in 1900, appealed to the Hardware trade of New England and urged the desirability of that trade being well represented, and pointed out the numerous advantages likely to accrue therefrom.

Local Associations of Plumbers.

The next speaker was Herbert E. Jennison of Fitchburg, president of the New England Master Plumbers' League. Mr. Jennison spoke interestingly of his experience in forming local associations in the plumbing trade. He said the plumbers have had for many years national and State organizations, but they had found, in order to do effective work, strong local associations in every town were necessary, and with the object of forming such associations they sent out capable men who thoroughly understood their story and who could present it in an attractive light. These agents remain in a town long enough to organize dealers, making it a point not to leave until they succeed. In this way the New England Master Plumbers' League has become the parent of about

Three Hundred Local Associations,

all of which are thoroughly alive and doing good work. Mr. Jennison said it had been found that the only successful organizers were men whose time was valuable to them in their own business, and that they could not be expected to give their efforts without compensation, therefore they were paid. He cited several examples illustrating the low conditions prevailing in several localities, and showed how these had been immediately improved upon the formation of local associations. He also expressed a hope that where there were local associations of both plumbers and Hardware dealers in a town they might co-operate for the betterment of both trades.

President Parlin then read the following letter from a prominent Western Massachusetts Hardware merchant:

An Interesting Letter.

Don't think you can bring about a greatly changed condition of affairs at once. Put in a large stock of patience, perseverance and charity, and draw on it freely. Get it firmly fixed in your minds that your aims and obj ts in doing business are probably not very different from those of your competitors; that if you are after money, they are after it also, and that what appeals to you as a move toward this result will appeal to them also, and while they may occasionally make mistakes, they are all the time improving.

Don't meet cut prices till you have investigated. There will probably be found either a prevarication on the part of the customer or extenuating circumstances to excuse the competitor. Think of how much you will make by upholding prices, rather than how much you will lose if you do not make the sale. The balance will always be on the side of firm prices.

Don't be afraid to talk face to face with your competitors. If you hear of their cutting give them the facts as you know them and the customers' names. Don't beat about the bush; give it to them straight, and draw on your charity if they do not present a valid excuse for cutting.

Don't be afraid to "acknowledge the corn" if they bring a just accusation against you—we are all liable to make mistakes.

Don't get your prices too high; give it to your customers gradually. The most serious trouble we have had has occurred when we have been too avaricious and by high prices have invited outside competition.

Don't try to fix prices on too many goods or lines at first. Try a few, say Nails, Linseed Oil, Disston's Saws, Bailey's Planes, Screws, &c. Try them for a fortnight just to see how it works. If you succeed, as you certainly will if you draw on your stock of patience, you can add more.

Don't talk associations or trusts or alliances where it will get to the ears of your customers.

Don't acknowledge or allow your help to refer to any arrangements with your competitors across the street—your customers will be happier if they do not know all that is going on.

We find that we can divide our customers into practically three classes: CLASS A, the consumers, the farmer who buys and uses the Nails and Shovels; the woman who buys and uses the Tacks and Scissors; the man who buys and uses the Paint for his fences and barns. This class pay the regular retail prices, from which there should be no deviation.

CLASS B are the middlemen, the contractors, the blacksmiths, the boss painters, who buy of you and sell to their customers, Class A. This class are entitled to a better price than Class A, and we have adopted a separate schedule for them, which is as strictly adhered to as that for Class A.

CLASS C are the manufacturers and machine shops, who, from the amount of their purchases and their familiarity with current prices, through reading the daily papers and the visits which they receive from drummers, have to be sold on small margins. Our experience has been to exclude them from our arrangements, but as far as possible to charge them regular prices on their daily pick up orders.

I have given you nothing new, nothing that you do not already know, but they are the thoughts that come to me most readily as the result of some years of experience, and I hope may prove useful to some of the members of your association.

R. R. Williams, Hardware Editor of *The Iron Age*, was then introduced to speak at the request of the association in regard to

Local Associations of Retail Hardware Merchants.

After referring to the good work done by the association and the prospect of its still greater usefulness to its members and the trade as a result of its giving increased attention to definite measures for the relief and benefit of the merchant, Mr. Williams took up the subject of the evening and discussed some of its practical phases with a view especially of suggesting

lines on which competing retail merchants can work together in harmony.

IMPORTANCE OF LOCAL ASSOCIATIONS.—The speaker referred to the rapidly changing conditions of trade and the difficulties which are coming up and presenting new problems to retailers. The formation of State and sectional associations, with the prospect of a national organization ultimately, is a matter to be regarded with satisfaction, and much can doubtless be accomplished through such agencies. The matter of local associations is, however, one of direct practical importance and gives promise of accomplishing more than many a more ostentatious movement. If merchants are only wise they can accomplish a great deal for the betterment of trade and the advancement of their own interests by understandings reached with their fellow merchants in the same community. The subject is deserving most careful consideration.

TEACHINGS OF EXPERIENCE.—This matter is one which has often been tried in a spasmodic way and in scattered instances. It is now with the coming together of merchants in their State associations receiving more attention than ever. In the West especially it is a prominent part of association work, and deserves to be given a more prominent place in the East. Extended acquaintance with the trade and their methods of working shows that the lines on which merchants can agree and co-operate in harmony differ widely with the special characteristics of the individuals and the varying circumstances of the case. The experience of the trade has not in all cases been encouraging and a good many attempts to reach understandings with competitors or to carry them out when reached have been unsuccessful. Others, however, have accomplished much and give encouragement to merchants to pursue still further this line of effort. This experience has been valuable as indicating among other things matters which may be the subjects of agreements between merchants and the ways in which the merchants can work together to mutual advantage.

HOURS OF CLOSING.—This is one of the simplest matters which can be the subject of agreement between competitors. It is desirable for many reasons that the evenings should be rescued from business, that the proprietors and their clerks may have an opportunity to devote time and energy to other and higher purposes, which have an elevating and refining influence upon life. Many merchants find it feasible to close at an early hour on most of the evenings of the week. The early closing movement is, however, not so general as it should be.

GENERAL POLICY.—In a good many places, Mr. Williams pointed out, the understandings between merchants covered such agreements as these: That the use of trading stamps or giving of prizes in any form be discontinued; that programme advertising be discountenanced, and that the practice of making presents to fairs or other charitable enterprises be abandoned. The agreements may often go beyond these and cover the methods of meeting the competition of racket or department stores. Instances were cited in which the merchants by concerted action met the cut prices of department stores, quoting conspicuously at still lower prices the goods which were used as leaders, and with most satisfactory results. One case was mentioned in which this policy had the effect of making the department stores give up the use of Hardware articles as leaders. By intelligent and united action of this kind against the common enemy much can be accomplished.

JOINT PURCHASE OF GOODS.—In some places and on certain classes of goods this can be done very advantageously. In a good many towns in various parts of the country it is practiced and some merchants have been for years uniting their orders, thus obtaining lower quotations from the manufacturers and effecting a material saving in freight. This method of co-operation implies very satisfactory relations between the merchants, but it is often feasible, and it is evidently a growing practice. The case of a prosperous association in a Western city was referred to where the members of the association united in this joint purchase, having a purchasing committee and all the necessary machinery. They are thus enabled to obtain prices closely approximating those at which the jobbers purchase. More frequently the arrangement is one in which only two or three merchants unite.

CREDITS AND COLLECTIONS.—Merchants can often very advantageously take action together to protect themselves against losses from sales to irresponsible parties. Mr. Williams alluded to several methods by which this is done, the general principle being that the merchants united in the preparation of lists of the parties in the community likely to become customers, who are rated so as to indicate the credit which should be given them. This is accomplished sometimes by simple means, but in others, especially in the larger towns, a more elaborate system is necessary. The matter of collections is sometimes successfully coupled with the rating of customers, one collector being employed by the associated merchants. This is a feature deserving consideration, and it may be that this is a method which might be more generally adopted than at present.

SELLING PRICES OF GOODS.—Where there exists between competitors a fair degree of confidence, it is often very desirable, and a source of increased profit, to have an understanding in regard to the prices at which some leading goods should be sold. In some cases this covers only a few of the staples which are often sold with little or no profit. In others it goes further and takes in a number of prominent articles, often in the line of season goods. The speaker illustrated this point by reading the schedules of prices adopted by merchants in different sections of the country. To reach and carry out an understanding of this kind requires good management and good faith, but it can be done. Besides the advantage of preventing unbusinesslike competition and unprofitable sales it has been found that where there is an agreement on the prices of a few leading goods customers are not nearly as likely to go from store to store inquiring the prices of other goods which they have occasion to buy, and the practice of shopping around is materially diminished.

Mr. Williams touched, in conclusion, on some principles which should be borne in mind in connection with efforts to establish local associations, alluding to the wisdom of making the attempt in some form, the mistake of trying to accomplish too much at the outset, and the need of tact and consideration for the feelings and methods of fellow merchants.

The closing address was made by Rev. F. S. Fisher of New York, after which D. Fletcher Barber moved that a vote on the several questions before the association be postponed until the next meeting, at which time it is hoped that every out of own member will be present to take part in the discussion and to vote thereon.

The association has in prospect a lecture by Prof. W. B. Cohoe on the "Chemical Constituents of Steel and Their Relations to Its Properties."

Hardware Club of New York.

AT a meeting of the Board of Governors of the Hardware Club, May 12, the following new members were added to the roll:

A. H. GILBERT,
Times Building, New York.

FREDERICK I. SIMPSON,
Sickels & Nutting Company, New York.

JOHN T. UNDERWOOD,
30 Vesey street, New York.

Walker & Paterson, Niagara Falls, N. Y., were succeeded on the 15th inst. by Walker & Paterson Company, with a capital stock of $25,000. The stockholders of the company are R. M. Walker and T. H. Paterson of Niagara Falls, Scott C. Ball of New York and Geo. P. Towns of Buffalo. The company will conduct a wholesale and retail business in general Hardware, Stoves, House Furnishings and Mill Supplies, with a department devoted to plumbing, steam fitting, &c.

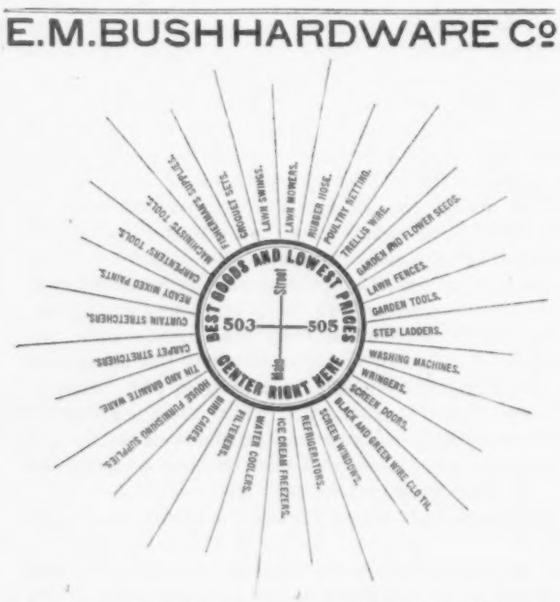
Trade Winning Methods.

This department will contain a description of approved methods of bringing customers to the store by means of newspaper advertising, circulars and such special expedients and methods as are found useful by enterprising and progressive Hardwaremen.

A cordial invitation is extended to merchants to co-operate in the effort to make it suggestive and of practical use to the trade.

AN ADVERTISEMENT CRITICISED.

From a gentleman who has given a good deal of attention to the matter of advertising we have the following criticism on the striking advertisement which was given in our last issue, which we reproduce here that our readers may have it before them in connection with the criticism:



The Advertisement Criticised.

While appreciating the merit and originality of the advertisement in question, our correspondent suggests improvements which in his judgment would add to its efficiency:

Is it a Good Ad.?

I notice in your issue of the 11th inst. the attractive advertisement of E. M. Bush Hardware Company. I believe that such display is, as your caption states, "A Striking Advertisement," but I don't believe that such display makes paying advertising matter. It is quick to catch the eye, but I believe that very few people will stop to study it out.

I have found that good, sensible talk, plainly set up and illustrated, brings the best returns. The advertisement in question calls attention to numerous articles, but tells nothing of interest about any of them.

A Change Suggested.

If the inner circle were divided into equal parts by a vertical line, it would be seen that the names printed upon the right of this line could be easily read, while to read those upon the left of the line a person must either turn his paper over or stand on his head. I don't believe many persons will take the trouble to do either.

About the Results.

The Bush Hardware Company say that the returns from the advertisement were good. I would like to ask what ratio the inquiries for goods named upon the right bore to those named upon the left. I would also like to know if the actual returns from the effort paid for the expense of it in profits upon the goods sold as a *direct* result.

I make this inquiry because it has been my experience that such displays brought some inquiries and often caused a good deal of comment, but seldom brought paying results. I would like to hear from other merchants upon this point through your columns.

AN ATTRACTIVE BOOKLET.

Dickson & Co., a well-known and enterprising house at New Castle, Pa., recently published for distribution to their customers a very neat booklet, which admirably served to call attention to some of their lines. The cover was of a light purple tint, and bore the simple inscription:

A Satisfactory Store

which, printed in heavy purple ink, appeared in the upper left hand corner of the face of the booklet. The dimensions of the cover were about 1 inch longer and ½ inch wider than the pages of the pamphlet, which were about 6 x 4½ inches, with liberal margins at the top, bottom and sides. The pages of the booklet, 16 in number, were of cream colored paper, with illustrations in purple.

Housefurnishing Goods

We have kept quality up in this line just the same as in everything else in our store.

There is no two ways about it; good, heavy, retinned stamped ware can't be sold as cheap as the light ware with one thin coating of tin.

You'll find that the economical people buy the best ware every time.

We buy carefully in this line—always sure that a new article is really good before we offer it to our trade.

We do the "finding out"—you get the benefit.

So many "new things" are worthless; you can fill a kitchen full of them if you want to—and have the money.

In the small space we have there would be no use in trying to describe our stock of housefurnishing goods.

To make it short, we have "everything for the kitchen."

Dickson & Company

Page from an Attractive Booklet (About two-thirds size).

By way of leading up gracefully and tactfully to a consideration of the goods carried in stock the firm, under the heading,

A Little Business Talk,

devoted one of the introductory pages to the following remarks:

> The whole secret of running a successful business is in giving satisfaction to its customers.

This satisfaction must not only be in price, but in quality and careful service.

This little book is gotten up to tell you that we have a store of just that kind—to tell you about some of the goods in it.

We have made this book just the same way that we do everything else—the best we know how.

We hope that you will think it is too good to throw away.

We hope that it will interest you enough to try us for your next wants in our line.

We have a big, bright, cheery store full of the best goods money can buy—and the prices are right, too.

Let us make a customer of you.

A Satisfactory Store.

Following they mention some of the reasons why they have a satisfactory store:

EXPERIENCE—lots of it; head of the firm thirty-one years, another member eighteen; another twelve, and another nine; all in the same business, all in the same town.

QUALITY is always first here—always has been—always will be.

You can always buy at this store with that comfortable feeling that you are getting the best.

PRICE—"Good goods at as low prices as good goods can be sold" tells the whole story.

A fair profit is all we ask—not too little, not too much.

And another thing; everybody's dollar is the same size at this store.

SERVICE that is prompt, careful and polite is the only kind here, and you get the same attention whether your purchase is five cents or five dollars.

Attention is then directed on the following pages to some of their lines, including

GOOD LUCK STOVES AND RANGES,
GOOD LUCK GAS RANGES,
CLASSIC GAS RANGES,
STRANSKY STEEL WARE,
WESTERN WASHER,
HOUSE FURNISHING GOODS,
RAMBLER BICYCLES,
SHERWIN-WILLIAMS' PAINTS.
BERRY BROTHERS' VARNISHES,
HARNESS,
TROY BUGGIES,

a page being devoted to each subject. We reproduce above, in about two-thirds size, the page advertising House Furnishing Goods, which is a good example of the method adopted and the way in which the departments of the firm's business are referred to.

The matter for the booklet was prepared by one of the members of the firm, the drawings being original with them.

The booklet was distributed from house to house by a very careful carrier. As to its success in winning trade the firm state that it is a very hard matter to check the result of any advertising medium. They very truthfully remark that one may do a large amount of advertising and spend a great deal of money in it, but if the store is not the right kind with good goods and competent and polite help, the money is thrown away. We are advised by Dickson & Co. that the edition of the booklet has been entirely exhausted so that they are not in a position to furnish copies.

William Blair.

WILLIAM BLAIR, for many years a very prominent factor in the wholesale Hardware trade, died at a ripe old age at his residence in Chicago on the 10th inst. of pneumonia. He was born at Homer, Cortland County, N. Y., on May 2, 1818, of New England stock. He began his business career at Cortland as a Hardware clerk in 1832, when but 14 years old. Four years later his employer, Oren North, decided to open a branch store at Joliet, Ill., and Mr. Blair was sent there to manage the business. The venture was successful until the collapse of the land boom came in 1837, and with it a financial crash that disturbed the whole country. Mr. Blair was so well prepared to meet it, however, that he was able to purchase the stock of his employer and continued the business profitably for five more years. In August, 1842, he transferred his business to Chicago, and soon afterward was joined by his brother, Chauncey B. Blair, then living in Michigan City, Ind.

With an increased capital the firm enlarged their wholesale department, becoming the first of the kind in Chicago. The selling of iron was made a special feature, and a large warehouse was opened at 95 Lake street. In 1846 Mr. Blair bought his brother's interest, and took his brother-in-law, William E. Stimson, as a partner, the firm name changing from William Blair & Co. to Blair & Stimson. Mr. Stimson had to retire on account of poor health in a short time, and Mr. Blair managed the business alone until 1853, when C. B. Nelson was admitted to partnership.

The business then became exclusively wholesale. They occupied a large building at 176 Lake street, which Mr. Blair erected. Another partner, O. W. Belden, was admitted in 1856, and in 1865 a larger building was put up by the firm at 179-181 Randolph street to accommodate the growing business needs. This remained the headquarters of the firm until the big fire of 1871. Before the ruins had ceased smoking the firm were installed at 30-32 South Canal street.

Less than a year after the fire Mr. Blair had rebuilt a five-story structure at 172-174-176 Lake street. At this time the firm name of William Blair & Co. represented the most profitable Hardware business in the West. Mr. Blair was one of the first men of the trade to realize that a change was to come in the West in the methods of selling the product of the Hardware and Cutlery factories by their concentration in the hands of jobbing firms in the larger cities in the interior. Acting upon this belief he made contracts with leading manufacturing firms, which resulted very profitably.

On January 1, 1888, Mr. Blair retired from active business, having acquired a handsome fortune, and desiring to pass the remainder of his life in its quiet enjoyment. His was then the oldest business house in Chicago. His partner of many years' standing, James M. Horton, organized a stock company to continue the business under the name of Horton, Gilmore, McWilliams & Co. They did a flourishing trade until the panic of 1893, when they received a shock from which they were unable to recover, and December 7, 1897, made an assignment. The stock of goods on hand was sold to Hibbard, Spencer, Bartlett & Co., and thus closed the career of this famous and time honored house.

Mr. Blair was pre-eminently distinguished among business men for his exactness, thorough reliability and conscientiousness. Although of a modest and retiring nature, he was active in many philanthropic enterprises, such as hospitals, orphan asylumns, children's homes, &c. He was a Presbyterian by faith. His long residence in Chicago and his prominence as a business man also caused him to become identified with a number of financial enterprises, all of a safe and conservative though lucrative character. In 1854 he married Miss Sarah M. Seymour of Lynne, Ohio, who survives him with one son, Edward Tyler Blair. Mr. Blair's son was in business with him for several years prior to the winding up of the old firm of William Blair & Co.

The Knight of the Grip.

XXXV. KINDLINESS; COURTESY; CONCLUSION.

IF there is one thing about my relations with the modern knight-errant that pleases me more than others, it is the belief that the friendly feeling that I entertain for him is in a measure at least reciprocated. Of all the results of my acquaintance with him the ones that I prize the most are

The Little Confidences

that have come to me from time to time as evidences of his kindly regard and trust—the letter recently received from one of the most generous hearted gentlemen on the road announcing his father's death; the more recent recital, by a worried salesman athirst for sympathy, of his fears that his wife would not survive an impending surgical operation; the tale of another of the injustice of the house that he had just quit, which led to his resigning his position; the sight of the photograph of another's baby, just received by mail, &c. One man submitted for criticism a poem that he had written and which he had tentative ideas regarding sending away for publication; another told me of his grievance against a buyer who would not give him a hearing; another of a side issue, where the investment of the savings from his salary would soon make him independent of the road; another of his new wife and home; still another, a fresh faced young man of social instincts, asked me to introduce him to some nice girl. I find this all very pleasant from the kindliness that calls it forth. There is no class of men on earth with whom I would rather be upon good terms than with the traveling salesmen, wide awake and quick of perception, self poised and with the center of their little earth just beneath their boot heels. I like to meet a man face to face and eye to eye, and deal with him upon the basis of a common trust and good will, and this I can do with the traveling men who visit the Hardware jobbers, and with the more limited number of jobbers' salesmen with whom I have come in contact.

Courtesy.

I recently read an exceedingly well written article setting forth the American idea of a gentleman as contrasted with that of his beef eating cousin. After reading it through I tried to apply the author's description to the various men I know, and more than half of those on my list of gentlemen, according to the magazine's standard, were traveling salesmen. The essence of gentlemanliness lies not in the manner, but in the actuating spirit behind it, and I have found in these exponents of every day manliness a considerateness and a fine courtesy that are indices of the innate breeding that marks the highest type of American manhood. There are exceptions, of course, but in thinking of the craft as a whole one in some way loses sight of them. The boors do not represent the general run of salesmen any better than they do their employers. Dame Fortune herself, with truly feminine perception, places a premium upon gentlemanly qualities by turning her back upon her uncouth votaries upon the road who are ruled by the "three blind appetites" and lack the qualities to make them wholesome factors in good society. The "husky boy" referred to in a previous chapter has already dropped out of the ranks and disappeared. So, too, has the bibulous gentleman who predicted his own fate—and so, too, do others who offend.

In Conclusion.

I have reached this last chapter with a slight feeling of regret which it would be hard to analyze—particularly in view of the difficulty I have at times experienced in crystallizing and putting into definite form the desultory impressions and half noted experiences of ten years of observation of traveling men as they pass in and out. I have jotted them down with but little attempt at order or logical sequence, at the fag end of busy days and on the afternoons of Saturday half holidays, with no thought of elegance of style or the manner of their reading—simply striving to set matters forth as they appear to me.

No Advice Given.

I have studiously avoided giving advice or of having the appearance of doing so, nor do I think that any can be found herein except by implication, as the reader makes his own deductions from the effects the different phases of the travelers' experience have had upon one observer. If there is one thing of which the salesman is not in need, it is advice. He gets reams of it from his employers and columns of it in the various trade journals. He has it shouted at him in every convention of Hardwaremen, and to prevent his missing any of the gems of thought there expressed the adviser or his admiring friends get the speech printed and his employers send it out by mail. The salesman has my sincere sympathy, and far be it from me to add to his load by the weight of a single "Do!" or "Don't!" If he is worthy of his calling he will turn a deaf ear to all general advice any way, as every healthy, self reliant man of average ability, with enough decision of character to make him want to keep true to his own individuality, is bound to do, and only consider that which is directed at him individually and based upon some recent occurrence in his own experience. Every man who is a man blazes out his own path with his common sense and his natural gifts as guide and tools, and no amount of advice is worth the taking except where it touches the advisee's own experience.

Might Be Worse.

If, after having read thus far, you find the matter not to your liking, reflect upon the many things yet left unsaid and be grateful.

"This little book is not so bad,
Or so it seems to me,
As what I might have made it, had
I built it thicker. See?"

as some poet, to me unknown, has written of his own production.

There are many things I have refrained from saying.

Farwell, Ozmun, Kirk & Co.'s Catalogue.

FARWELL, OZMUN, KIRK & CO., St. Paul, Minn., have issued a catalogue containing 226 large pages devoted to Builders' Fine Hardware. The many late improvements in mechanical construction and beauty of design have been carefully considered in making the selection of goods. In arrangement the aim has been to show the line in the simplest and most satisfactory manner for the convenience of the dealer, avoiding repetitions or line groupings. Kindred goods are so arranged as to allow comparisons to be easily made.

Letters from the Trade.

Our readers are invited to discuss in these columns questions of trade interest connected with the manufacture or sale of Hardware. We shall be pleased to have a free expression of opinion on subjects deserving the attention of Hardware merchants and manufacturers.

A. G. Spalding & Bros. and the Northwestern Retail Hardware Association.

We are in receipt of the following letter which defines the position taken by the Northwestern Retail Hardware Association in regard to the sale of Spalding's goods to department stores and catalogue houses:

To the Editor: My attention has been called to an article that appeared in *The Iron Age* of April 27, under the heading "Why Spalding's Policy Will Fail," also to the reply thereto of Mr. Spalding in your issue of May 4.

As both these articles contain statements which are misleading to our members, we feel that an explanation is proper at this time.

In the article of April 27 the writer says, "I am just in receipt of the corrected list of the Northwestern Retail Hardware Association, and notice that Spalding is listed as 'unfavorable' to the objects of the association. Why he has been so listed I cannot state, but it is probably because he has not answered the letters of our secretary."

Under date of March 25, 1899, A. G. Spalding & Bros., Chicago, replying to our letter of March 22, in which we state the objects of this association, say, "Under our policy of doing business, which we inaugurated on January 1 last, we sell to any legitimate retail dealer the goods we manufacture, *department stores or catalogue houses*, but we sell to them upon the same conditions, &c."

It is well known that the policy of the Northwestern Retail Hardware Association is *not to purchase goods from those who sell to the department stores or catalogue houses located within the jurisdiction of the association.*

It is, therefore, quite evident why A. G. Spalding & Bros., of Chicago, have been listed as unfavorable to this organization.

Mr. Spalding's letter to *The Iron Age* of the 4th inst., stating that he knows nothing of this association, and does not recall having seen any correspondence between the association and his firm, may cause some of your readers to believe that the association had not given A. G. Spalding & Bros. the proper notice and information previous to reporting them. The following facts show that this is not the case:

During 1897 no less than two notices and a copy of our resolutions were sent them, and one notice and a copy of our resolutions were sent to them in both the years 1898 and 1899.

In this connection we wish to say that the Executive Committee of this association has never made a report without giving the parties ample notice, except in one or two cases of open and notorious violation of the rules of the association.

NORTHWESTERN RETAIL HARDWARE ASSOCIATION.
J. W. CLARK, Secretary.

MINNEAPOLIS, MINN., May 8, 1899.

Do Retailers Realize Profits from Advances?

The following letter from a well-known traveler in the Northwest describes the condition of things in that territory and brings up the question as to whether or not retailers are giving away to their customers much of the profit which they might realize on goods the price of which has advanced:

The past 90 days have seen more orders booked by manufacturers and jobbers in Minnesota than probably in any similar length of time in the history of trade in this State.

Both jobbers and retailers have discounted the future, buying heavily in anticipation of an advance. In nearly every instance when the advance has taken place the merchant fondly surveys his piles of Nails or rows of Enameled Ware or Nickel Copper Ware, and says: "Ah, there! I am 20 to 40 per cent. winner." That is to say, he will be when he has sold the goods at a profit. In other words, "It is up to the consumer, good and plenty."

January, February and March of 1899 will long be remembered as three of the poorest months in the Northwest for actual retail trade that our merchants have passed through for several years.

The future looks better, provided (and I ought to write provided with a big P) the dealer does not give away all of the advance to the customer. For example, I was in a town the other day where one merchant was selling Nails at $2 rates. He had bought early and his Nails had cost him about $1.80, delivered. Now they would cost him $2.80, delivered. He was not only giving $1 with every keg, but demoralizing trade all over that county.

A Question for Merchants.

We are in receipt of the following inquiry from a Southern Hardware dealer, and shall be glad to have the views of the trade on the subject:

A Hardware merchant carries a stock of $4500 to $4800. His expenses are $1350 to $1400 per annum. If he handles a few vehicles, and a small amount of farm implements, what should his sales amount to annually?

Also what average per cent. of profit should his loss and gain account show?

Your opinion on this matter will be appreciated by us, and will, no doubt, interest many of your readers.

Requests for Catalogues, &c.

CHARLES NURSE & CO., manufacturers and merchants, 182-184 Walworth Road, London, S. E., England, as referred to in their advertisement in this issue, are desirous of receiving catalogues and discount sheets of American manufacturers producing Tools and Machinery. In their present catalogue of 200 pages is shown, in addition to goods of their own manufacture, a comprehensive assortment of Tools for machinists, engineers, carpenters, plumbers, &c., made by American makers. They state that it is their purpose to print an enlarged edition of about 300 pages and distribute 30,000 copies.

C. E. Harris has opened a new store at 11 Main street, Brockton, Mass., where he will carry a line of Hardware, Cutlery, Tools, Paints, &c. Mr. Harris will be pleased to have copies of catalogues and other matter issued by manufacturers.

American Bicycle Company.

THE AMERICAN BICYCLE COMPANY were incorporated on May 12, 1899, at Trenton, N. J., with a capital stock of $80,000,000, of which $35,000,000 is preferred stock with 7 per cent. cumulative dividends and $45,000,000 common stock. The company are to be financed by the United States Mortgage & Trust Company, New York, and Lee Higginson & Co., Boston. This consolidation is reputed to have secured options on about 90 per cent. of the Cycle plants of the country. The reason assigned for the amalgamation of interests is the maintenance of quality and making the business more stable than under the present basis of competition.

Representatives of the larger Bicycle companies are now holding meetings in this city, and the result will be awaited with interest.

Wooster Hardware Company, Wooster, Ohio, wholesale and retail Shelf and Heavy Hardware, Agricultural Implements, Sporting Goods, &c., have added a Carriage repository, 180 x 34 feet, and a Wagon room, 60 x 34 feet, to their former quarters.

Manning, Maxwell & Moore's New Establishment.

MANNING, MAXWELL & MOORE have moved from 111-113 Liberty street, New York, into handsomely appointed quarters in the Singer Annex Building, 85-89 Liberty street, near Broadway. They have the entire street floor and the floor above, besides storage room in the cellar, where coarse and heavy goods are carried. The street floor is fitted up to display samples of goods and carry stock. The offices are on the second floor, and have been fitted up with much special cabinet work for documents and other business data. Special vaults have been built to keep books and other valuables safe. In the rear are the large private offices for H. S. Manning and Charles A. Moore. The floors are brilliantly lighted by electricity, and there are two elevators for handling goods. This concern deal in miscellaneous supplies for railroads, steamships, mills and factories, and take the entire output of a number of plants. Some of the concerns are owned or controlled by them, such as Shaw Electric Crane Company, Pedrick & Ayer Company, Ashcroft Mfg. Company, Consolidated Safety Valve Company and Hayden & Derby Mfg. Company.

A New Cutlery Company.

THE VALLEY FORGE CUTLERY COMPANY were incorporated at Trenton, N. J., on April 10, and capitalized at $50,000. The incorporators are Carl F. Boker, H. Boker, C. H. Hawkins, George C. Weaver, F. C. Wheeler, Edward Grafemuller, James Tyler, C. W. Weaver and W. C. McKenna. The company are now building a new factory at Newark, N. J., and will equip it with the latest and most improved machinery, and begin manufacturing Pocket Cutlery at an early date. The officers are C. F. Boker, president; George C. Weaver, vice-president, and C. H. Hawkins, secretary and treasurer. F. C. Wheeler and Edward Grafemuller, with the three officers named, constitute the Board of Directors. Hermann Boker & Co., 101-103 Duane street, New York, will market the entire product.

Trade Items.

NEAL & BRINKER, 168 Church street, New York, have been appointed agents of the Holland Mfg. Company, Baltimore, Md., who are manufacturers of Nails, Tacks, Glaziers' Points, Roll Paper Holders, Double Pointed Tacks, &c., and are outside of the combination which exists on some of the above goods.

THE ELLIOTT & REID COMPANY, Richmond, Ind., whose full page announcement appears in this issue, are directing their efforts toward selling their product, the Royal, Wonderful U. S. and the Richmond Fences direct to the trade exclusively, establishing agencies among dealers, &c. The three Fences, while manufactured by the same concern, differ materially in point of construction, but the manufacturers emphasize the fact that all are made from high carbon steel in such manner as to equalize the expansion and contraction when put up. These Fences are supplied the trade only in 20, 30 and 40 rod rolls.

M. GOULDS' SON & Co., Newark, N. J., have moved their New York warerooms from 64 to 83 Reade street, where thew have the entire street floor and two basements. This business was established in 1832, their principal product being Stair Rods, Curtain Poles, Stair Plates, &c., Brass and Bronze Railings, Grills and Lattice Work for all kinds of public and private buildings, together with a line of Trunk Hardware and Bag Trimmings.

Among the Hardware Trade.

Jones Hardware Company of Richmond, Ind., owing to the prosperous condition of business are putting up a four-story brick building, 78 x 116 feet. It will be located near the present establishment, opposite railroad depot, and will be newly equipped throughout. The company do both a wholesale and retail business in Heavy and Shelf Hardware, Iron and Steel, Pipe Fittings, Paints and Oils, Carriage Hardware, Wood Work, &c.

Edgar Dick, Terre Haute, Ind., has removed to new quarters at 30 South Fourth street, which are more than double the size of his former premises. Mr. Dick is increasing the variety and quantity of his stock.

Weast & Henry have succeeded Ben L. Weast & Co. in Center, I. T. They have also purchased the stock of J. D. Gee.

George A. Tromer has opened up in the Shelf Hardware and Tinware business in the Chamberlain Building, at Lyons, N. Y.

A. V. Hlava has moved his Hardware business from Pleasanton to Ravenna, Neb.

Burns, Noble & Barnes have succeeded Burns & Noble in the wholesale and retail Hardware and Farm Implement business, at Lampasas, Texas.

Riverside Hardware Company (Incorporated) have purchased the business of W. K. Fuller, at Everett, Wash. The company have moved to more commodious quarters on the corner of Pine street and Hewett avenue, where they occupy two stores, with tin shop attached. Their line of goods includes Shelf Hardware, Stoves, Tinware, Loggers' and Well Supplies, Sporting Goods, &c.

Geo. W. Marshall has opened up in the retail Hardware, Stove, Tinware and Sporting Goods business, at Crystal, N. D. Mr. Marshall's store is 50 x 70 feet in dimensions.

Anton Popelar, Dodge, Neb., will soon commence the erection of a new building for the accommodation of his Hardware, Stove, Implement and Sporting Goods business.

Paxson & Schoenberg, Saginaw, Mich., have succeeded Biesterfeld Bros.

Joseph R. Proctor has purchased the interest of Frank Bentley in the firm of Bentley & Proctor, at Ravenwood, Mo. The new firm style is Proctor & Proctor.

J. J. Shaffer & Son have succeeded C. D. Shaffer, at Stillwater, O. T.

Maire & Co., Fergus Falls, Minn., are intending to move their business to larger quarters in the near future.

C. F. Perrin, Ashland, Wis., plumbing, gas fitting, &c., has doubled the size of his establishment and put in a stock of Shelf Hardware, Sporting Goods, Paints, Oils, &c. Later Mr. Perrin intends adding a line of Stoves.

The E. R. Moses Mercantile Company are successors to G. N. & E. R. Moses, at Great Bend, Kan., to Hoisington Hardware & Implement Company, at Hoisington, and to Claflin Hardware & Implement Company, at Claflin, G. N. Moses having disposed of his interest in these different concerns to E. R. Moses.

M. W. Evans has succeeded Gillette & Evans, at Ketchum, Idaho. R. R. Warren is managing the business, which is conducted on a strictly cash basis.

Vastenburgh & McClure, formerly of St. John, Kas., have opened up in business at Turon, handling Hardware, Stoves, Tinware, &c.

Paulk Hardware Company, Fitzgerald, Ga., have recently embarked in business. The company are capitalized at $10,000, and the line of goods carried embraces Hardware, Stoves, Sporting Goods, &c.

A. J. Smith & Co., Fessenden, N. D., have sold out to H. M. Hendrickson, who is continuing at the old stand.

Jensen, King, Byrd Company, Spokane, Wash., wholesale and retail Hardware, Stoves, Tinware, Miners' and Mill Supplies, Sporting Goods, &c., are about to take possession of new quarters. The main storeroom is 40 x 142 feet in dimensions, with an L 50 x 50 feet, two stories high, with 9-foot basement under all.

E. A. Lyons, formerly of the firm of John Lyons & Bro., Everett, Kan., has bought the stock of G. W. Meeks, at Stillwater, O. T. Mr. Lyons expects to add materially to the stock thus acquired.

Hungate & Canaday have succeeded C. L. Canaday and Sheets & Reeves, Blythedale, Mo. The firm are now erecting a double brick building, one part of which will be devoted to Hardware and the other to a line of general merchandise.

The store of Palmer & Wagner, Corfu, N. Y., was destroyed by fire a short time since.

Freeman, Pecht & Co. have succeeded Freeman & Pecht, at Dumont, Iowa. The store has been enlarged and about $500 worth of goods added to the stock.

W. R. Brown has purchased the Hardware, Stove and Agricultural Implement stock of W. F. Barnes & Co., Corning, Ark.

Fiedler & Leonard, Thomasboro, Ill., are building an addition to their store. The addition will be 28 x 66 feet, making the dimensions of the enlarged store 28 x 186 feet.

F. C. H. Adams has sold his business at Stamford, Neb., to B. W. Roe & Co., and is now located at Clay Center, where he has put in an entirely new stock.

Chas. H. Davis has purchased the store of William Hosier, Nantucket, Mass.

C. O. Stensrud has succeeded his brother, G. A. Stensrud, in the Hardware and Stove business, at Superior, Wis. Mr. Stensrud has also purchased the stock of B. L. Monck, at West Superior, and will remove it to the Superior store.

J. W. Murchison, Wilmington, N. C., has admitted W. E. Perdew to an interest in his business, and the style has been changed to J. W. Murchison & Co.

Harris Hardware Company, Richmond, Va., have remodeled their store with a view of increasing its convenience and attractiveness. One of the new features of the store is a 5, 10 and 25 cent counter for retailing and displaying goods. The firm advise us that they are realizing on the advances made in prices, having put in a large stock of goods when the market was much lower than it is at present.

J. W. and Calvin Walker and J. W. Kimmons have purchased the business of the Rogers Hardware Company, Rogers, Ark. They have also bought out A. J. Burnham of the same place, and will unite the two stocks and continue business under the style of Rogers Hardware Company, occupying quarters in the Burnham block. The store has been refitted and enlarged.

Chas. H. Hale has succeeded Hale & Holman, at St. Albans, Vt.

Griffith & Witter have succeeded Callahan & Witter, at Hinton, W. Va. The stock carried includes Stoves, Ranges and Furnaces, with plumbing, heating, tin and cornice department.

Percy G. James has succeeded M. S. Rapelyea in the Hardware business at Jamaica, N. Y.

R. M. Bixby has moved his stock of Hardware from Foster to What Cheer, Iowa.

George Childs, Wakefield, Neb., has disposed of his furniture stock and will hereafter devote himself entirely to the sale of Hardware, Stoves, Agricultural Implements, Buggies, Harness, &c.

C. E. Cox & Co. are successors to Wortham & Cox at Tuscola, Ill.

B. H. L. Wright has sold out his Hardware business at Sherman, Texas, to E. E. Flippen. The new owner will increase the stock formerly carried and will also conduct a tinshop.

Coleman & Son have sold out their Agricultural Implement stock at Miltonvale, Kan., to W. T. Matthews.

David Isaak & Co. have succeeded Mewing & Isaak at Eureka, S. Dak.

Beekman & Clary, Dundee, N. Y., were burned out a short time since. They are rebuilding and will have a store 35 x 100 feet in dimensions arranged on modern lines.

The store of J. D. Thomas at Waco, Texas, was recently damaged by fire. The loss was fully covered by insurance and business has been resumed.

G. W. Smith has sold out his business at Buckhannon, W. Va., to Hall Hardware Company, who are continuing at the old stand.

The Hardware store of Henry Kelsey at Aurora, S. Dak., was destroyed by fire a short time since.

F. J. Sengbusch of Milwaukee has purchased the Hardware business of L. N. Larson, at Burlington, Wis.

Charles Snyder has purchased the Hardware and Stove business of George Whiteman & Co., at Wayland, N. Y.

Piper & McLain, Union Star, Mo., are putting up a store building, 22 x 80 x 14 feet, with basement, 22 x 80 x 8 feet.

L. P. Slattum has recently opened up in the Hardware and Tinware line, at Erskine, Minn. Mr. Slattum has a store, 24 x 60 feet, and carries a stock of about $2000.

In a special issue of the *Tuscaloosa Times*, May 12, the history of this Alabama town is traced and reference made to some of the leading business interests. Among these prominent place is given to the Allen & Jemison Company, illustrations being presented of the company's establishment and of the president, T. B. Allen, and secretary and treasurer, M. P. Jemison. The company were organized in 1883, succeeding Jemison & Allen, and do a wholesale and retail business in Hardware, Machinery, Building Material, &c.

Fairy Door Holder.

The Utility Mfg. Company, Hartford Conn., are making the Fairy door holder, as here illustrated about one-

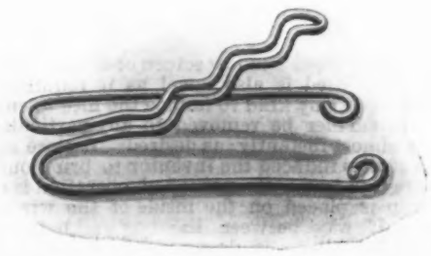


Fig. 1.—Fairy Door Holder.

third size. It is made of one piece of steel spring wire and is designed to keep doors open at any desired point for ventilation, &c. In use it can be dropped on the floor, one foot depressing the spring, swinging the door over it

Fig. 2.—Method of Using Holder.

at the same time, the step feature suiting it to doors hinged at various hights above the floor. It is portable and light and is said to hold a door at any point without marring door, floor or wood work.

Barney & Reed Mfg. Company, 85 Water street, Boston, Mass., have recently made a shipment of their Walda Sectional Window Weights to South Africa. These window weights, we are advised, are meeting with ready sale among the hardware trade, by whom they are sold exclusively, and they have a number of advantages. A dealer is required to keep only five sizes to fill any order, and by their use it is possible to weight up any size window and eliminate the use of lead weights entirely.

The Illinois Fly Trap.

A novelty in the shape of a fly trap has been placed on the market by J. H. Jones, Streator, Ill. The construction of this trap is herewith illustrated. It is used in connection with the ordinary window screen. Fig. 1 shows the trap as viewed from the front of the screen and Fig. 2 represents the end section, showing how the flies enter the trap. The device is manufactured neatly from white gauze and is so made that it can be adjusted to fit

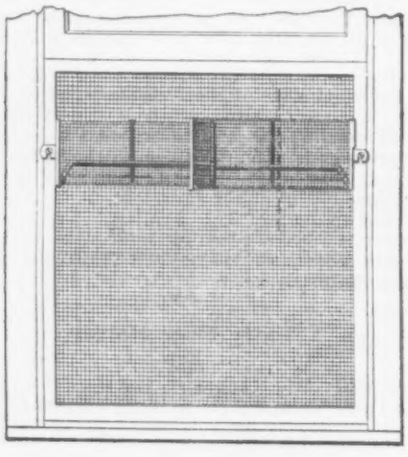


Fig. 1.—The Illinois Fly Trap.

any ordinary sized window screen or door. The manner in which it is used is also novel, as it requires no bait or sweetening of any kind to induce the flies to enter it. The trap can further be removed to any particular window or door almost instantly, as desired. A close study of the habits of flies induced the inventor to bring out and manufacture this trap. Its method of operation is as follows: The trap is placed on the inside of the window or door about half way between the top and bottom. If on a window, the shade is drawn down so as to darken the window above the trap, while the space below is left exposed to light. The shades on other windows, if any are

Fig. 2.—Sectional View of Illinois Fly Trap.

in the room, are drawn down their entire length to darken the windows, the only light in the room being the space below the trap of the window on which it is placed. The flies, however, instantly go to the lighted window and in a few minutes after doing so they are occupants of the trap. Its construction is such that it can very easily be removed.

Clark-Rutka-Weaver Company are successors to Clark-Rutka-Jewell Company, Grand Rapids, Mich. The latter company commenced business on January 1, 1898, with a capital stock of $25,000. They were reincorporated on April 12, 1899, with a capital stock of $50,000, all paid in. The line of goods carried is Heavy and Shelf Hardware, Tinware and Cutlery, in which an exclusively wholesale business is done. Trade is referred to as exceedingly good, the demand for all seasonable goods being large and orders for fall shipment coming in very freely. The officers of the reorganized company are M. J. Clark, president; J. J. Rutka, vice-president, and W. D. Weaver, secretary and treasurer.

O. B. Studley, Cambridge, Iowa, has admitted a partner in his business, and the style is now O. B. Studley & Co. Lately a stock of groceries, flour and oils has been added to the former assortment of Hardware, Stoves, Tinware, Glass, &c.

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Current Hardware Prices.

REVISED MAY 16, 1899.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer are printed in *Italics*, and the prices named represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. They apply to such quantities of goods as are usually purchased by retail merchants. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, and are in many cases their regular prices to the small trade, lower prices being frequently quoted to the fair retail trade, either by the manufacturers or by the jobbers.

Cut Prices—*In the present condition of the market, while many advanced prices are announced by the manufacturers, lower prices are often made by the wholesale trade who have stocks on hand purchased at former quotations.*

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE INDEX SUPPLEMENT (April 6, 1899), which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" is in preparation and will contain the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters Blind—
Domestic, ₱ doz. $3.00....33⅓&33⅓&10%
North's.....10%
Zimmerman's—See *Fasteners, Blind.*

Window Stop—
Ives' Patent.....40%
Taplin's Perfection.....5%

Ammunition—See *Caps, Cartridges, Shells, &c.*

Anvils—American—
Eagle Anvils.....₱ ℔ 7¼@7¾¢
Hay-Budden, Wrought.....8¼@8¾¢
Horseshoe brand, Wrought.....9¼@9¾¢
Samson.....₱ ℔ 7¼@8¢
Trenton, Wrought.....₱ ℔ 8¼@8¾¢

Imported—
Armitage's Mouse Hole.....8¾@9¼¢
Peter Wright's.....9¼@9¾¢

Anvil, Vise and Drill—
Millers Falls Co., $18.00.....20%

Apple Parers—See *Parers, Apple, &c.*

Augers and Bits—
Common Double Spur ...75&10@80%
Boring Machine Augers..75&10@80%
Car Bits, 12-in. twist.....
60&10&10@70&10%
Jennings' Pattern:
Auger Bits.....70&5@70&10%
Car Bits.....60@60&10%
Bits.....25%
Ford's Auger and Car Bits..
40&10@40&10&10%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip. R. Jennings' list.....
40@40&10%
No. 30. R. Jennings' List..50&10@60%
Russell Jennings'.....25&10&2½%
L'Hommedieu Car Bits15&10@15&10&5%
Pugn's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Bell Hangers' Bits.....50%
Snell's Car Bits.....60&10&5@70%
Wright's Jennings Bits (R. Jennings' list).....50%

Bit Stock Drills—
Standard List .....60&10&10@70%

Expansive Bits—
Clark's small, $18; large, $26.....
50@50&10%
Lavigne's Clark's Pattern, No. 1, ₱ doz., $26; No. 2, $18....50@50&10%
Steer's No. 1, $26; No. 2, $18...40@40&5%
Swan's.....40@40&10%

Gimlet Bits—
Common Double Cut..gro. $3.75@3.85
German Pattern.....gro. $5.00
Double Cut, makers' lists .50@50&10%

Hollow Augers—
Bonney's Adjustable, ₱ doz.....$16.00
Douglass'.....33⅓&33⅓&10%
Stearns', Common, No. 6.....10%
Stearns', all other numbers.....20&10%

Ship Augers and Bits—
Ford's.....40&10@40&10&10%
Snell's.....40@40&5%
L'Hommedieu's.....15&10@15&10&10%
Watrous'.....40@40&10%

Awl Hafts, See *Hafts, Awl.*

Awls—
Brad Awls:
Handled .....gro. $2.75@3.10
Unhandled, Shouldered gro.65@70c
Unhandled, Patent.....gro. 70@75c
Peg Awls:
Unhandled, Patent....gro. 33@35c
Unhandled, Shouldered.gro.65@70c
Scratch Awls:
Handled, Common..gro. $3.25@3.75
Handled, Socket..gro. $11.00@12.00

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—
First Quality, best brands.$5.00@5.25
First Quality, other brands$4.25@4.75
Jobbers' Special Brands, good quality.....$4.00@4.75
Cheap Handled Axes.....4.75@5.25
Beveled, add 25c doz.

Axle Grease—See *Grease, Axle.*

Axles—

	Iron.	*Steel.*	
Concord, loose collar	*5¼c*	*5 c*	5% cash
Concord, solid collar	*5¾c*	*5½c*	
No. 1 Common	*5 c*	*5¾c*	
No. 1½ Com. New Style	*4½c*	*4¾c*	
No. 2, Solid Collar	*4¼c*	*4½c*	
Nos. 7, 8, 11 to 14		*60&5%*	
Nos. 15 to 18		*50%*	
Nos. 19 to 22		*70%*	

Balances—
Sash—
Caldwell low list.....30%
Pullman's.....65%
Vanderbilt.....30%
Spring—
Spring Balances .....50@50&5%
Chatillon's Light Spg. Balances..... 50%
Chatillon Straight Balances.....40&10%
Chatillon Circular Balances.....50&10%
Chatillon's Large Dial.....35%

Barb Wire—See *Wire, Barb.*

Bars—Crow—
Steel Crowbars, 10 to 40 lb., per lb...
2¼@2¾c

Beams, Scale—
Scale Beams, List Jan. 12, '88.....
50@50&5%
Chattillon's No. 1.....40%
Chattillon's No. 2.....50%

Beaters—Egg—
Dover Pattern, Family Size.....
gro. $5.50
Spiral.....gro. $3.75@4.25
Dover (Standard Co.), No. 10, ₱ gro. $6.25; No. 5, $5.75; No. 15, $14.00
Dover (Tapiin Mfg. Co.) No. 50, ₱ gro. $5.25; No 100 $6.00; No. 102, $8.00; No. 150. ₱ doz. $1.50; No. 152 $2.00.
Standard Lyon..₱ doz. $1.75; 3 doz. $5.00
Wonder (S. S. & Co.).....₱ doz. 75¢

Bellows—
Blacksmith—
Standard List.....70@70&10%

Net Prices.

Inch..	*20*	*22*	*24*	*26*	*28*	*30*
Each..	*$4.00*	*4.25*	*5 00*	*5.50*	*6.25*	*7.50*
Extra Length:						
Each..	*$4.75*	*5.25*	*5.75*	*6.50*	*7.40*	*8.75*

Molders—

Inch..	*9*	*10*	*11*	*12*	*14*	*16*
Doz...	*$6.25*	*6.75*	*8.00*	*9.00*	*11.50*	*13.75*

Hand—

Inch...	*6*	*7*	*8*	*9*	*10*	*12*
Doz....	*$3.40*	*3.75*	*4.00*	*4.75*	*5.50*	*6.40*

Bells—Cow—
Kentucky .....70@70&10%
Cheaper grade.....75@75&10%
Jersey.....75@75&10%
Texas Star.....50&10%

Door—
Gong, Yankee.....60&10%
Ho se, R. & E. Mfg. Co.'s.....50&10%
Lever and Pull, Sargent's.....
45&10@45&10&5%

Hand—
Hand Bells, Polished.....70@70&5%
White Metal.....70@70&5%
Nickel Plated.....50&10@60%
Swiss .....60%&5@66⅔&10%

Miscellaneous—
Farm Bells.....lb. 2c
Steel Alloy Church and School..50&10%

Belting
Rubber—
Common Standard.....75@75&10%
Standard.....70&5@70&10%
Extra.....60&10@60&10&5%
High Grade.....60@60&10%
Leather—
Extra Heavy, Short Lap .....50&10%
Regular Short Lap .....60@60&5%
Standard .....60&10@60&10&5%
Light Standard.....70&10%

Bench Stops—See *Stops, Bench*

Benders and Upsetters, Tire—
Brettell Tire Upsetter, $15.....50%
Green River Tire Benders and Upsetters.....30%
Stoddard's Lightning Tire Upsetters.....
40@50%

Bicycle Goods—
Lane's Cycle Hanger.....33⅓&5%
John S. Long's Son's 1899 list:
Balls.....50%
Chain.....50%
Parts.....50%
Spokes.....50&10%

Bits—
Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Bit Holders—See *Holders.*

Blind Adjusters—See *Adjusters, Blind.*

Blind Fasteners—See *Fasteners, Blind.*

Blind Staples—See *Staples, Blind.*

Blocks—Tackle—
Common Wooden...75&10@75&10&5%
Eddy's All Steel, Common Bushed....70%
Eddy's All Steel, Bronze Bushed...60&5%
Hartz All Steel, Common Bushed.50&10%
Hartz All Steel, Bronze Bushed..50&10%
Ford's Star Brand, Self Lubricating..70%
Hollow Steel, Ford's Pat. Star Brand...
50&10%
Lane's Pat. Adj., Perfect Safety and Junior 30%
Stowell's Novelty, Mal. Iron.....50&10%
See also *Machines, Hoisting.*

Boards, Stove—
1898 or 1899 List.....33⅓&5@40&5%

Bolts—
Carriage, Machine, &c.—
Common, list Jan. 30, '95.....
70@70&10&5%
Norway Iron, $3.00, list Oct. 7, '84...
75&10@75&10&5%
Phila. Eagle, $3.00 list.....85&15%
Bolt Ends, list Jan. 30, '95.....
70@70&10&5%
Machine list June 12, '96.....
70&10@70&10&10%

Door and Shutter—
Cast Iron Barrel, Round Brass Knob:

Inch.....	*3*	*4*	*5*	*6*	*8*
Per doz...	*$0.27*	*.30*	*.38*	*.48*	*.66*

Cast Iron Bottom, Japanned:

Inch.....	*6*	*8*	*10*
Per doz.....	*$0.83*	*1.05*	*1.65*

Cast Iron Chain, Flat, Japanned:

Inch.....	*6*	*8*	*10*
Per doz.....	*$1.10*	*1.33*	*1.87*

Cast Iron Shutter, Brass Knobs:

Inch.....	*6*	*8*	*10*
Per doz.....	*$0.49*	*.77*	*.88*

Wrought Barrel Brass Knob:

Inch.....	*3*	*4*	*5*	*6*	*8*
Per doz ..	*$0.44*	*.50*	*.61*	*.70*	*1.28*

Ives' Patent Door.....65@65&10%
Wrought Flush—
B. K., Sargent's list.....50&10@60%
B. K., Stanley's list..60&10@60&10&5%
Sunk, Sargent's or Stanley's list.....
50&10@50&10&10&5%
Wrought Shutter, Standard list
60&10&7¼@70%
Wrought Square, Standard list
75@75&10%

Stove and Plow—
Plow .....70@70&10%
Stove, list August 27, 1898..70@70&10%

Tire—
Common, list Feb. 28, '83.....
70@70&10%
American Screw Company:
Norway Phila., list Oct. 16, '84.75&10%
Eagle Phila., list Oct. 16, '84....80&10%
Bay State, list Feb. 28, '83.....70%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84..75&10%
Eagle Phila., list Oct. 16, '84....80&10%
Eclipse, list Feb. 28, '83.....70%
Port Chester Bolt & Nut Company
Empire, list Feb. 28, '83.....70%
Keystone Phila., list Oct. '84....80&10%
Norway Phila., list Oct. '84.....75&10%

Borers, Tap—
Borers Tap, Ring, with Handle:

Inch.....	*1¼*	*1½*	*1¾*	*2*
Per doz..	*$3.75*	*4.75*	*5.25*	*6 75*
Inch.....		*2¼*		*2½*
Per Doz.....		*$3 00*		*11.00*

Enterprise Mfg. Co.....25@300
No. 1, $1.25; No. 2, $1.65; No. 3, $2.5% each.

Boring Machines—*See Machines, Boring.*

Braces—
NOTE.—Most Braces are sold at net prices.
Common Ball, American...$1.10@1.20
Barber's.....60@60&10%
Fray's Genuine Spofford's.....50&10&5%
Fray's No. 70 to 120, 81 to 123, 207 to 414.....50&10&5%
P., S. & W. Co., Peck's Patent.....
60&10&5@60&10&10%

Brackets—
Cast Iron, plain.....75@75&10%
Wrought Steel.....70@10@75%

Bright Wire Goods—See *Wire.*

Broilers—
Wire Goods Co.....75@75&10%

Buckets, Well and Fire—See *Pails*

Bucks, Saw—
Hoosier.....₱ gro. $22.00@$24.00

Bull Rings—See *Rings, Bull.*

Butts—Brass—
Wrought list Sept., '96.40&5@40&10%
Cast Brass, Tiebout's.....50%

Cast Iron—
Fast Joint, Broad..... 60@60&10%
Fast Joint, Narrow.....
60&10@60&10&10%

Loose Joint.....	*75@75&10%*
Loose Pin.....	
Mayer's Hinges.....	
Parliament Butts.....	

Wrought Steel—

Loose Joint.....	*List Apr. 1, 1895, 75&10 @75&10&10% 10%*
Table and Back Flaps..	
Narrow and Broad.....	
Inside Blind.....	
Loose Pin.....	

Loose Pin, Ball and Steeple Tip....
80&5@80&10&5%
Bronzed Wrought Narrow and Inside Blind Butts.....50&10@50&10&5%

Cages, Bird—
Hendryx, Brass:
3000, 5000, 1100 series.....10%
1200 series.....40%
200, 300, 600 and 900 series.40&10@50%
Hendryx Bronze:
700, 800 series.....40&10@50%
Hendryx Enameled.....40&10@50%

Calipers—See *Compasses.*

Calks, Toe—
Burke's, One Prong, Blunt.....4@4¼¢
Burke's, One Prong, Sharp.....5@5¼¢
Burke's, Two Prong, Blunt.....5@5¼¢
Burke's, Two Prong, Sharp .....6@6¼¢
Gautier, One Prong, Blunt.....5½@6¢

Can Openers—See *Openers, Can*

Cans, Milk—
Buffalo Pattern:

	5	8	10 gal.
Concave Cover.....	$1.25	$2.00	$2.20
Convex Cover.....	1.40	2.15	2.35
Illinois Pattern.....	....	1.80	2.00
Iowa Pattern.....	...	1.75	1.95
New York Pattern...	...	2.25	2.45
Baltimore Pattern....	....	2.35	2.55

Cans, Oil—
Galvanized Blue Band, 1-gal., ₱ doz. $1.60@$1.80
S. S. & Co., Galvanized Family with faucet, 3-gal., ₱ gro. $54; 5-gal., $60; 10-gal., $180.00
Glass Oil.....₱ doz. $1.60@$1.85

Caps—Percussion—
Eley's E. B 50c
G. D .....per M 32@34c
F. L.....per M 37@40c
G. E.....per M 47@50c
Musket .....per M 57@60c

Primers—
Berdan Primers, $1.00 ..... 2%
B. L. Caps (Sturtevant Shells) $1.00 ..... 2%
All other primers..... *$1.00@$1.10*

Carpet Stretchers—
See *Stretchers, Carpet.*

Cartridges—
B. B. Caps, Con., Ball Swgd. ...*$1.90*
B. B Caps, Round Ball... *$1.12@1.18*
Blank Cartridges:
32 C. F., $5 50..... 2%
38 C. F., $7 00..... 2%
22 cal. Rim, $1.50..... 2%
32 cal. Rim. $2.75..... 2%
Central Fire ..... 15&5&2%
Pistol and Rifle..... 25&5&2%
Primed Shells and Bullets...15&5&2%
Rim Fire Sporting..... .....50&2%
Rim Fire, Military..... 15&5&2%

Carpet Sweepers—
See *Sweepers, Carpet.*

Casters—
Bed Plate, etc..... 50@70&5%
Martin's Patent (Phœnix) ....60@60&5%
Payson's Anti-friction Furniture..... 70&10&5%
Payson's Anti-Friction Truck.60&10&5%
Standard Ball Bearing..... 50%
Tucker's Patent, low list..... 50@50&5%

Cattle Leaders—
See *Leaders, Cattle.*

Chain—
American Coil, Cask Lots:

5-16	¼	5-16	⅜	7-16	½	9-16
$7.10	5.35	4.55	3.70	3.55	3.40	3.35
¾	⅞	1	1 inch.			
$3.25	3.20	3.10	3.10			

Less than Cask lots add 1-10c. per lb.
German Coil, list July 24, '97 ..... 60&10&10@70%
German Halter Chain, list July 24, '97..... .....60&10&10&5@70%
Trace, Wagon and Fancy Chains, list April, '98..... 60&10&10@70%
Jack Chain, list July 10, '93:
Iron..... 70&10%
Brass ..... 60@60&10%
Gal. Pump Chain.....*lb.* 4½@4¾c
Breast, Hitching and Rein Chains.
Covert Sad. Works..... 70%
Covert Mfg. Co.:
Breast..... 45&3%
Halter..... 45&2%
Heel..... 45&2%
Rein..... 45&2%
Stallion..... 45&3%
Oneida Community:
Niagara and Eureka Weldless Coil and Halters..... 65&5@70%
Niagara and Eureka Weldless Cow Ties..... 60&5@65%
American Coil and Halters..60&5@45%
American Cow Ties.....50&5@35&5%

Chalk—(From Jobbers.)
Carpenters', Blue.....*gro. 50@52c*
Carpenters', Red .....*gro. 45@L"c*
Carpenters', White.....*gro. 40@42c*
See also Crayons.

Chalk Lines—See *Lines.*

Checks, Door—
Bardsley's..... 40%
Columbia..... 50&10%
Eclipse..... 60@60&10%

Chisels—
Socket Framing and Firmer
Standard List ..... *75&10@80%*
Buck Bros..... 30%
Charles Buck..... 30%
Douglass..... 75&10@80%
L. & I. J. White..... 30@30&5%

Tanged and Miscellaneous.
Tanged Firmers ..... *40&10@50%*
Cold Chisels, good quality lb. 14@16c
Cold Chisels, fair quality..... *lb. 12c*
Cold Chisels, ordinary..... *lb. 7@7½c*
Buck Bros..... 30%
Charles Buck..... 30%
L. & I. J. White, Tanged..... 25&5%

Chucks—
Beach Pat., each $8.00..... 20%
Morse's Adjustable, each $7.00..... 25%
Skinner Patent Chucks:
Combination Lathe Chucks..... 40%
Drill Chucks..... 30%
Independent Lathe Chucks..... 40%
Improved Planer Chucks..... 20%
Universal Lathe Chucks..... 40%
Union Mfg. Co.:
Combination..... 40%
Czar Drill 30%
Geared Scroll..... 33⅓%
Independent..... 40%
Union Drill..... 30%
Universal..... 40%
Face Plate Jaws..... 35%

Clamps—
Adjustable, Hammers'.....20@20&5%
Adjustable, Stearns'.....30@30&10%
Cabinet, Sargent..... 45&10@50&10%
Carriage Makers', P., S. & W. Co..40&10%
Carriage Makers', Sargent's..... 50&10@50&10&5%
Beely, Parallel..... 33⅓%
R. I. Tool Co.'s Wrought Iron..... 25%
Saw Clamps, see *Vises, Saw Filers'.*
Stearns Malleable, with Wrought Iron Screw..... 75@75&5%
Stearns Steel..... 25&10%
U. S. Lock Co.....40&10@40&10&5%

Cleaners, Walk—
Star Socket, All Steel....℔ doz. $4.00 net
Star Shank, All Steel....℔ doz. $3.75 net

Cleavers, Butchers'—
Foster Bros. Flat Hds., 30%; Rd. Hds., 40%
New Haven Edge Tool Co.'s..... 40%
Nichols Bros., Flat hdl., 30%; Rd. hdl., 40%
Fayette R. Plumb..... 33⅓&7½%
P., S. & W. ..... 33⅓&5@33⅓&10%
L. & I. J. White..... 25%

Clippers—
Chicago Flexible Shaft Company:
Handy Toilet..... ℔ doz. $7.20
Mascotte Toilet ..... ℔ doz. $8.40
Monitor Toilet..... ℔ doz. $9.00
Stewart's Patent..... ℔ doz. $10.00

Clips, Axle—
Eagle and Superior ¼ and 5-16 inch.....*75c@10@75c@10c&5%*
Norway, ¼ and 5-16 inch..*75@75c&5%*

Cloth and Netting, Wire—*See Wire, &c.*

Cocks, Brass—
Hardware list (Globe, Kerosene, Lever Bibbs, Racking, &c.). ..... 70@70c&5%

Coffee Mills—See *Mills, Coffee.*

Collars, Dog—
Brass, Pope & Stevens' list..... 40%
Embossed, Gilt, Pope & Stevens' list30&10%
Leather, Pope & Stevens' list..... 40%

Compasses, Dividers, &c.
Ordinary Goods .....*70c&10@75%*
Bemis & Call Hdw. & Tool Co.:
Dividers..... 65%
Calipers, Call's Patent Inside..... 55%
Calipers, Double..... 70%
Calipers, Inside or Outside..... 70%
Calipers, Wing..... 60%
Compasses..... 50&5%
J. Stevens A. & T. Co..... 25&10%

Coolers, Water—
S. S. & Co.: 2-gal., $2.79; 3-gal., $3.20; 4-gal., $3.60; 6-gal., $4.75; 8-gal., $7.20; 11-gal., $11; 14-gal., $14 each 60%

Coopers' Tools—
See *Tools, Coopers'.*

Cord— Sash—
Braided, Drab and Fancy ..... *lb. 25c*.... *30@30&10%*
Braided, White, lb..... *14@18%*
Cable Laid Italian..lb. A, 18c; B, 16c
Common India..... *lb. 8½@9c*
Cotton Sash Cord, Twisted....*12@14c*
Patent Russia ..... *lb. 12½@13c*
Cable Laid Russia.....*lb. 13½@14c*
India Hemp, Braided.....*lb. 11@12c*
India Hemp .....*lb. 9@10c*
Patent India. ..... *lb. 10½c*
Pearl Braided, cotton ..... ℔ ℔ 16¢
Massachusetts, White ..... ℔ ℔ 17¢
Eddystone Braided Cotton..... ℔ ℔ 18¢
Harmony Cable Laid Italian..... ℔ ℔ 18¢
Ostrawan Mills:
Crown, Solid Braided White...℔ ℔ 18¢
Braided, Giant, White..... ℔ ℔ 16¢
Peerless:
Cable Laid Italian..... 16¢
Cable Laid Russian..... 13¢
Cable Laid India..... 11¢
Braided India..... 18¢
Samson:
Braided, Drab Cotton..... ℔ ℔ 33@35¢
Braided, Italian Hemp..... ℔ ℔ 31@33¢
Braided, Linen..... ℔ ℔ 53@56¢
Braided, White Cotton..... ℔ ℔ 27@30¢
Silver Lake:
A quality, Drab, 40¢..... 15&7½%
A quality, White, 35¢..... 15&7½%
B quality, Drab, 35¢..... 15&7½%
B quality, White, 30¢..... 15&7½%
Italian Hemp, 40¢ ..... 15&7½%
Linen, 67½¢..... 15&7½%

Wire, Picture—
Braided or Twisted .....*85@85c&5%*

Corn Knives and Cutters—See *Knives, Corn.*

Crackers, Nut—
Acme, Japanned, ℔ gr. $30..... 40%
Acme, Nickel Plated, ℔ gr. $30..... 20%
Turner & Seymour Mfg. Co..... 50%

Cradles—
Grain..... *55%*

Crayons—
White Round Crayons, gross...*5@6c*
Cases, 100 gro., $4.50@5 00, at factory.
D. M. Steward Mfg. Co.:
Metal Workers', ℔ gr. $2.50....20@25%
Railroad, ℔ gr. $2.00..... 20@25%
Rolling Mill, ℔ gr. $2.50 ..... 20@25%
Soapstone Pencils, ℔ gr. $1.50..20@25%
See also *Chalk.*

Creamery Pails—See *Pails, Creamery.*

Crooks, Shepherds'—
Fort Madison, Heavy .....℔ doz. $7.00
Fort Madison, Light..... ℔ doz. $6.50

Crow Bars—See *Bars, Crow.*

Cultivators—
Victor Garden ..... ℔ doz. $10.00

Curry Combs—
See *Combs, Curry.*

Cutters— Meat—
American..... 30%

Nos.	1	2	3	4	B	5
Each	$5	$7	$10	$25	$50	$60

Enterprise..... 25@25&7½%

Nos.	5	10	12	22	32
Each	$2	$3	$2.50	$4	$6

Dixon's, ℔ doz..... 33⅓%

Nos.	1	2	3	4
	$14.00	$17.00	$19.00	$30.00

Hale's, ℔ doz..... 70@70&5%

Nos.	11	12	13
	$27.00	$33.00	$45.00

Home No. 1, ℔ doz. $26.00..... 60%
Little Giant, ℔ doz..... 50&10%

Nos.	305	310	312	320	322
	$35.00	$48.00	$44.00	$72.00	$68.00

Miles' Challenge, ℔ doz.....45@45&10%

Nos.	1	½	3
	$22.00	$30.00	$40.00

New Triumph No. 605, ℔ doz. $24.00.. 33⅓&5%

Nos.	100	150
	$15.00	$18.00

Woodruff's, ℔ doz 33⅓%
Chadborn's Smoked Beef Cutter, ℔ doz. $60.00
Enterprise Beef Shavers..... 25@30%

Slaw and Kraut—
Henry Diss on & Son:
Slaw, Corn Grater, &c..... 40%
Kraut Cutters 24 x 7, 26 x 8, 30 x 9..55%
Kraut Cutters 36 x 12, 40 x 12..... 40%
Tucker & Dorsey Mfg. Co.:
Kraut Cutters..... 50@50&10%
Slaw Cutters, 1 Knife, ℔ gr....$15@$18
Slaw Cutters, 2 Knife, ℔ gr....$20@$27

Tobacco—
All Iron, Cheap.....*doz. $4.50@$5 00*
Enterprise..... 25@30%
National, ℔ doz. $21.00..... 30&5%
Sargent's, ℔ doz. $24.00..... 60@60&10%

Washer—
Appleton's, ℔ doz. $16.00..... 60&10@60&10&10%
Bonney's..... ℔ doz. $4.25

Diggers, Post Hole, &c.—
Iwan's Improved Post Hole Auger.40&5%
Iwan's Perfection Post Hole Digger.... ℔ doz. $10.00
Samson, ℔ doz. $34.00..... 25%

Dividers—See *Compasses.*

Dog Collars—See *Collars, Dog.*

Door Checks—
See *Checks, Door.*

Door Springs—
See *Springs, Door.*

Drawers, Money—
Tucker's Pat. Alarm Till No. 1, ℔ doz. $18; No. 2, $12; No. 3, $11; No. 4, $12.

Drawing Knives—
See *Knives, Drawing.*

Drills and Drill Stocks—
Common Blacksmiths' Drill..each $1.50
Blacksmiths' Self-feeding.....*each $5.00@6.00*
Bench Drills, Stearns'..... 50@50&10%
Breast, Millers Falls, each $3.00 ..... 25%
Breast, P., S. & W..... 40&10%
Goodell Automatic Drills..40&5@40&10%
Ratchet, Bignall & Keeler..... 30&5%
Ratchet, Curtis & Curtis 25%
Ratchet, Ingersoll's..... 25%
Ratchet, Parker's..... 40%
Ratchet, Weston's..... 20@25%
Ratchet, Whitney's..... 30&10%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00..... 33⅓%

Twist Drills—
Standard List.....*60c&10&10@70%*

Drill Bits or Bit Stock Drills—See *Augers and Bits.*

Drill Chucks—See *Chucks.*

Dripping Pans—
See *Pans, Dripping.*

Drivers, Screw—
Balsey's Screw Holder and Driver, ℔ doz. 2½-inch, $6; 4-in., $7.50 6-in., $9..40%
Buck Bros..... 30%
Buck Bros' Screw Driver Bits..... 27½%
Champion..... 40&10%
Disston's Flat Blade, Exercise, &c..... 0%
Douglass Mfg. Co..... 20@20&10%
Electric Spiral..... 50&10&10&5%
Eilrich's Socket..... 40&10%
Fray's Hol. H'dle Sets, No. 3, $12.00 50%
Gay & Parsons' Ratchet..... 35%
Goodell's Automatic ..... 50&10&10@50&10&10&5%
Howard-Allard Spiral.....50&10&10&5%
Jones Reversible..... 50%
Mayhew's Black Handle..... 50%
Mayhew's Monarch..... 45&10%
New England Specialty Co..... 50&10%
New York, Manhattan and Handy...20%
Sargent & Co.'s:
Nos. 1, 20, 40 and 60.50&10@50&10&5%
Nos. 50 and 55.....50&10&10@60&5%
Screw Driver Bits..... ℔ doz. 50@70¢
Stanley's R. & L. Co.'s:
No. 64, Varnished Handles.....70&10%
No. 86..... 75&10%

Egg Beaters—See *Beaters, Egg.*

Emery—*Nos. 4 to 54 to Flour, CF:*

	46 gro.	180 gro.	F.FF.
Kegs.....	*lb.* 4½c	5 c	3 c
½ Kegs ....*lb.*	4¾c	5¼c	3¼c
¼ Kegs ....*lb.*	5 c	5½c	3½c
10-lb cans, 10 in case.....	6 c	6½c	5½c
10-lb. cans, less than 10.....*10*	c	*10* c	8c

Enameled and Tinned Ware—See *Ware, Hollow.*

Escutcheon Pins—
See *Pins, Escutcheon.*

Extractors, Lemon Juice—See *Squeezers, Lemon.*

Fasteners, Blind—
Zimmerman's..... 50&10%

Faucets—
Cork Lined ..... *70c&5@70c&10c&5%*
Metallic Key, Leather Lined..... *65c&10@70%*
Red Cedar..... *50@50c&10%*
B. & L. B. Co.:
West's Lock, Open and Shut Key50&10%
John Sommer's Peerless Tin Key.....40%
John Sommer's Boss Tin Key..... 50%
John Sommer's No Brand Metal Key..60%
John Sommer's W. P. Metal Key.....40%
John Sommer's Diamond Lock..... 40%
John Sommer's I. X. L. Cork Lined...50%
John Sommer's Reliable Cork Lined.60%
John Sommer's Common Cork Lined.70%
John Sommer's Chicago Cork Lined..60%
John Sommer's O. K. Cork Lined.....50%
John Sommer's Perfection Cedar....40%
Star..... 60@60&5%
Star, Metal Plug, new list..... 40@40&5%
Stearns' Wood, No. 200, Wood-lined Key..... 50&10%
Stearns' Matchless, Wood, No. 300 ..60%
Stearns' Gem, Wood, No. 400.....60&10%
Lockport, Metal Plug, reduced list.60&5%
Self Measuring:
Enterprise, ℔ doz. $36.00 ..... 40%
Lane's, ℔ doz. $36.00..... 33⅓%
National Measuring, ℔ doz. $36.00.33⅓%

Felloe Plates—
See *Plates, Felloe.*

Files—Domestic—
Best Brands..... *70@70c&10c&10%*
Good Brands..... *75c&10@80c&5%*
Fair Brands ..... *80c&5@80c&10%*
Second Quality..... *80c&10@85%*

Imported—
Stubs' Tapers, Stubs' list, July 24, '97 ..... *30@33⅓%*

Fixtures, Grindstone—
Net Prices:

Inch....	15	17	19	21	24
Per doz.	$2.50	2 60	2.95	3.35	4.50

Stowell's Grant Grindstone Hanger.... ℔ doz. $6.00@7.00
Stowell's Grindstone Fixtures....55&10%
P., S. & W. Co..... 50&10&10%
Reading Hardware Co..... 30&20&10%
Sargent's Patent.....70&10@70&10&10%

Fluting Machines—
See *Machines, Fluting.*

Fodder Squeezers—
See *Squeezers, Fodder.*

Forks—
Old, or 1895 list.
Hay, Manure, &c.60c&10@60c&10c&5%
1898, or High list.
Hay, 2 tine..... .....*70c&2%*
Hay, 3 tine ..... *70c&2%*
Manure, 4 tine ..... *60c&20c&2%*
Manure, 5 and 6 tine.....*70c&10c&2%*
Spading..... .....*70c&15c&2%*
Victor, Hay..... ..60&33⅓&2½&2%
Victor, Manure..... 75&25&2%
Victor, Header..... 70&12½&2%
Champion, Hay..... 70&10&2%
Champion, Manure..... 75&2%
Columbia, Hay..... 70&7½&2%
Columbia, Manure ..... 75&5&2%
Columbia, Spading .. 66⅔&25&2%
Hawkeye Wood Barley 4 tine ℔ doz $5.00; 6 tine, $5.50.
Plated.—See *Spoons.*

1899 or high list

Frames—
Saw—
Red, Polished and Varnished..doz. $1.00@$1 10
White..... *gro. $3.25@$8.50*

Screens, Window and Door—
Bonanza Window Screens.....60@60&5%
Phillips' Window Screen Frames..60&5%
Porter's Extension Window Screens.. 60&5%
Stearns' Frames and Corners 25@25&10%
Stearns' Monarch Adjustable Window Screens..... 50%
Stearns' Gem Window Screen Frames. 25&10%
Wabash Adj. Window Screen..... 50%
Warner's Screen Corner Irons..33⅓&10%

Freezers, Ice Cream—
Qts... 2 3 4 6 8 10
Best. $1.40 1 60 1.85 2 30 3.00 3.90
Good $1 25 1 35 1.70 2 05 2 65 3.50
Fair. $1.00 1.10 1 30 1 75 2.30 2.90

Fruit and Jelly Presses—
See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse—

	Per 1000 Feet.
Hemp Fuse	*$2.60*
Cotton Fuse.....	*2.90*
Single Taped Fuse	*3.50*
Double Taped Fuse.....	*4.70*
Triple Taped Fuse.....	*5.70*

10%

Gates, Molasses and Oil—
Stebbin's..... .....*80c&20@85%*
Stearns' Molasses and Oil..... 30&10%

Gauges—
Barrett's Comb. Roller Gauge..... ℔ doz. $6.75@7.25
Marking, Mortise &c...... *60c&10@60c&10c&10%*
Stanley R. & L. Co.'s Butt & Rabbet Gauge..... 25&10%
Wire, Brown & Sharpe's..... 25%
Wire, Morse's..... 25%
Wire P., S. & W. Co..... 10&10%
Wire, Wheeler, Madden & Co..... 10%

Gimlets—

Nail, Metal, Assorted, gro. $2.00@2.50
Spike, Metal, Assorted gro. $3.75@4.00
Nail, Wood Handled, Assorted, gro. $4.30
Spike, Wood Handled, Assorted gro. $4.90

Glass, American Window

List Jan. 1, 1898.

Small lots from store:
Eastern.....80&20&5@85&10%
Western.....85@85&10%
From Factory, with Frt. Allowance:
Carloads.....85%
1000 boxes or more, Gulf Ports....85&10%
3000 boxes or more..85&5@85&5&2½%
5000 boxes or more.....85&10%

Glue—Liquid, Fish—

List A, Bottles or Cans, with Brush. 57½@50%
List B, Cans (½ pts., pts., qts.).... 33⅓@48%
List C, Cans (½ gal., gal.)....25@45%

Glue Pots—See *Pots, Glue.*

Grease, Axle—

Allerton's Axle:
1 lb Tins, ₩ gr.....$9.00
3 lb Tin Pails, ₩ doz., $2.00; 5 lb, $3.00; 10 lb, $5.00.
35 lb wood pails.....₩ doz. $12.00
Dixon's Everlasting....10-lb pails, ea. 85¢
Dixon's Everlasting, in bxs..₩ doz. 1 lb $1.20; 2 lb $2.00
Lower grades, special brands, ₩ gr. $5.00@6.50

Grindstone Fixtures—

See *Fixtures, Grindstone.*

Gun Powder—See *Powder.*

Hack Saws—See *Saws.*

Hafts, Awl—

Peg Patent, Leather Top...gro. $4.90
Peg Patent, Plain Top.....gro. $3.45
Sewing, Brass Ferrule ....gro $1.50
Saddlers', Brass Ferrule...gro. $1.35
Peg, Common.....gro. $1.25
Brad, Common.....gro. $1.35

Halters and Ties—

Covert Mfg. Co., Web and Rope...45&2%
Covert's Saddlery Works', 96 list.....70%

Hammers—

Handled Hammers—

Heller's Machinists'.....40@40&5%
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50, $1.75.....40&10%
Peck, Stow & Wilcox.....40@40&5%
Fayette R. Plumb:
Artisans' Choice, A. E. Nail...40&12½%
Engineers' and E. S. Hand.....60%
Machinists' Hammers.....60%
A. E. & A. E., Bell Face Nail...40&12½%
Other Nail Hammers.....50%
Sargent's C. S. New List.....45@50%

Heavy Hammers and Sledges—

3 lb. and under...lb. 45c
3 to 5 lb.....lb. 36c
Over 5 lb.....lb. 30c
} 75¢10¢5@80¢5%
Wilkinson's Smiths'.....9½c@10c lb.

Handcuffs and Leg Irons

See *Police Goods.*

Handles—

Agricultural Tool Handles—

Hoe, Rake, Fork, &c...60&10@60&10&5%
Shovel, &c., Wood D Handle.....60&10%

Cross-Cut Saw Handles—

Atkins'.....40%
Champion.....45@45&10%
Disston's.....50%
Ely's Perfection.....₩ doz. $3.00

Mechanics' Tool Handles—

Auger, assorted.....gro $2.25@$2.50
Auger, large.....gro. $2.75@$3.00
Brad Awl.....gro. $1.40@$1.50
Chisel Handles:
Apple Firmer, gro ass'd. $2.25@$2.50; *large, $2.75@$3.00.*
Hickory Firmer, gro ass'd, $2.25 @$2.50; large, $2.50@$2.75.
Socket, gro ass'd. Firmer, $1.50@$1.60; Framing, $2.50@$2.75.
File, assorted.....gro. $1.00@$1.25
Hammer, Hatchet, Axe, &c...60&10%
Hoe, Rake and Fork .....60&10@60&10&5%
Shovel and Spade, Wood D H'dle..60&17%
Hand Saw, Varnished, doz. 75@80c
Not Varnished.....55@60c
Plane Handles:
Jack, doz. 23@25c; Jack Bolted..55@60c
Fore, doz. 35@38c; Fore, Bolted..70@75c

Hangers—

Barn Door, New Pattern, Round Groove, Regular:

Inch	3	4	5	6	8
Doz	$1.28	1.68	2.16	2.64	3.30

Barn Door, New England Pattern, Check Back, Round Groove, Regular:

Inch	3	4	5	6
Doz	$2.86	3.74	4.84	6.16

Bigelow & Dowse Co.:
Paragon, No. 1, $3.50; No. 2, $4.50; No. 3, $5.50 ₩ doz.
Chicago Spring Butt Co.:
Friction.....35@35&10%
Oscillating.....35@35&10%
Big Twin.....35@35&10%
Chisholm & Moore Mfg. Co.:
Advance.....60&10%
Cleveland.....60&10%
Baggage Car Door.....50%
Elevator.....40%
Railroad.....55%
Lane Bros.:
Parlor, Standard.....40&10%
Barn Door, Standard.....60&10%
Covered.....60&10%
Cycle, ₩ doz. $12.00.....33⅓&5%
No. 50.....60&5%
Parlor Door, New Model.....40&5%
Lawrence Bros.:
Crown.....60&10%
New York.....60&10@60&10&5%
Sterling.....60&10%
McKinney Mfg. Co.:
No. 2, Standard, $18.....60&10%
No. 1, Special, $13.....60&10%
E. C. Stearns & Co.:
Davis Parlor Door.....50@50&5%
Gem Parlor Sliding Door....50&10%
Challenge.....50@50&5%
Steel Single Track Parlor, $6....50%
Royal Parlor Door.....50%
Warner's Pat.....20&10&10%
Warner's Imp'd Single.....40&10%
Stowell Mfg. and Foundry Co.:
Badger.....60&10%
Baggage Car Door.....33⅓%
Climax Anti-Friction.....55&5%
Elevator.....40%
Interstate.....60&15%
Magic.....50&10%
Matchless.....60&10%
Nansen.....60&10%
Parlor Door.....50&10%
Railroad.....55&5%
Street Car Door.....50&10%
Steel, Nos. 300, 400, 500.....45&15%
Wild West.....50&5%
Zenith for Wood Track.....55&5%
Taylor & Boggis Foundry Co.:
Kidder's.....50@50&10%
Van Wagoner & Williams Hdw Co., American Trackless.....33⅓&10%
Wilcox Mfg. Co.:
Aurora Steel Endless.....60%
Bike Roller Bearing....60&10&10%
Bike Steel Endless.....60&10&10%
C. J. Roller Bearing.....60&10&10%
Cycle Ball Bearing.....50&10%
Dye Steel.....60&10%
Economical Single Track.50&10&5%
L. T. Roller Bearing.....70%
New Era.....50&10%
New Richards.....60%
O. K. Roller Bearing.....70%
Prindle Improved.....60&10%
Richards' Improved.....60&10%
Richards' Single Track.....50&10%
Wilcox Dwarf Roller Bearing....40&10%
Wilcox-Ives.....60&10%
Wilcox Tandem Roller Bearing..60&10%
Wilcox Trolley Ball Bearing....40&10%
Wilcox Trolley Roller Bearing..50%
Wilcox Trolley Roller Bearing, Fire.....40&10%
Wood Track.....60%

Extra 5@10% often given.

Harness Menders—See *Menders.*

Harness Snaps—See *Snaps.*

Hasps—

McKinney's Perfect Hasp, ₩ doz. $1.10 40&10%
Wrought Hasps, Staples, &c.—See *Wrought Goods.*

Hatchets—

Best Brands.....40¢12½%@50¢5%
Cheaper Brands.....50¢10@60%

Hay and Straw Knives—

See *Knives.*

Hinges—

Blind Hinges—

Lull & Porter:

No.	1	1½	2	2½
Doz. pair	$0.47	.45	.40	.35

1868 Old Pattern:

No.	1	3	5
Doz. pair	$0.55	1.00	2.00

Parker.....75&10@75&10&5%
North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50.....10%
Reading's Gravity.....75&10%
Sargent's, Nos. 1, 3, 5, 11, 13..75@75&10%
Wrightsville H'dware Co.:
Acme, Lull & Porter.....80&10%
Buffalo Gravity Locking, Nos. 1, 3 and 5.....80&10&5%
Champion Gravity Locking, No. 75.....80&10&10%
1868, Old Pat'n, Nos. 1, 3 & 5...80&10%
Tip Pattern, Nos. 1, 3 and 5..80&10&5%
Double Locking, Nos. 20 and 25....75%
Empire, Nos. 101 and 103.....80%
Niagara Gravity Locking, Nos. 1, 3 and 5.....80&10%
Noiseless, Nos. 50, 60, 65 and 55....80%
O. S. Lull & Porter.....80&10&5%
Pioneer, Nos. 060, 45 and 5¼....75&5%
Steamboat Gravity Locking, No. 10..80&10&5%
Stanley's Steel Gravity Blind Hinges, ₩ doz. sets $1.30.....40&10%

Gate Hinges—

Clark's or Shepard's—Doz. sets:

No.	1	2	3
Hinges with Latches	$1.40	1.75	2.25
Hinges only	0.92	1.50	2.40
Latches only	0.46	.56	.80

New England:
With Latch.....doz. $1.45@1.50
Without Latch.....doz. $1.30@1.35
Reversible Self-Closing:
With Latch.....doz. $1.70@1.75
Without Latch.....doz. $1.30@1.35
Western:
With Latch.....doz. $1.75@1.80
Without Latch.....$0.75@$0.78

Spring Hinges—

Holdback, Cast Iron, gro. $15.00.... 50@50¢5%
Non-Holdback, Cast Iron, gro..... $5.50@$5.75

J. Bardsley:
Bardsley's Patent Checking.....15%
Bommer Bros.:
Bommer's.....40%
Chicago Spring Butt Co.:
Chicago.....30%
Garden City Engine House..30%
Keene's Saloon Door.....30%
Lawson Mfg. Co.:
Machine.....25%
Matchless Pivot.....40%
Payson Mfg. Co.:
Oblique, Dbl. Acting.....50@50&5%
E. C. Stearns & Co.:
Nos. 45 and 51.....70%
Stover Mfg. Co.:
Ideal, No. 16, Detachable, ₩ gr. $2.50
Ideal, No. 4.....₩ gr. $9.00
New Idea No. 1.....₩ gr. $9.00
New Idea, Double Acting.....45%
Van Wagoner & Williams Hdw. Co.:
Acme.....30&5%
American.....30%
Columbia, No. 14.....₩ gr. $8.00
Columbia, No. 18.....₩ gr. $24.00
Crown.....30%
Gem.....30%
Knoxall.....₩ gr. $9.00
Oxford.....30%

Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—

Strap and T Hinges. &c., list Mar. 15, 1898:
Light Strap Hinges. 75, 10¢5%
Heavy Strap Hinges...80¢10%
Light T Hinges.....70%
Heavy T Hinges.....75¢5%
Extra Heavy T Hinges....80%
} Extra 20@25%
Rolled Plate.....70¢10@70¢10¢5%
Screw Hook and Strap. { *6 to 12 in..lb 3 @5¼c*; *14 to 20 in..lb. 2¾@3 c*; *22 to 36 in..lb. 2⅛@2¾c*

Hoes—

Eye—

Scovil and Oval Pattern..60@60¢10%
Grub. list Feb. 25, 1899.....70¢10@75%
D. & H. Scovil .....35@35&5%

Handled—

1895 or Old List:
Cotton, Field, Planters', &c.... 60¢10@60¢10&5%
1898 or High List:
Field and Garden.....60¢10¢5¢2%
Ladies', Boys', Toy and Onion... 75¢12½¢2%
Street and Mortar.....75¢15¢2%
Cotton.....75¢10¢2½¢2%
Planters'.....75¢10⅞¢2%
Weeding.....75¢10¢5¢2%
Note.—Manufacturers and jobbers use a diversity of lists, and often sell at net prices.
Ft. Madison Crucible Garden Hoe..... 75&10&2%
Ft. Madison Crescent Cultivator Hoe, per doz.....$3.75
Ft. Madison Mattock Hoe, ₩ doz....$4.00
Ft. Madison Sprouting Hoe, ₩ doz..$4.50
Ft. Madison Dixie Tobacco Hoe..... 75&10%&2%
Kretsinger's Cut Easy, per doz.....$4.50
Warren Hoe.....60&10%

Hog Rings and Ringers—

See *Rings and Ringers.*

Hoisting Apparatus—

See *Machines, Hoisting.*

Hollow Ware—

See *Ware, Hollow.*

Holders—Bag—

Sensible Bag and Twine.....50%

Bit—

Angular, ₩ doz. $24.00..... 45&10%

File and Tool—

Nicholson File Holders and File Handles..... ...33⅓%

Hooks—

Cast Iron—

Bird Cage, Reading.....
Bird Cage, Sargent's List...
} ...66⅔@70%
Clothes Line, Sargent's List...50@50&5%
Ceiling, Sargent's List.....50@50&5%
Clothes Line, Stowell's..... ....70&5%
Clothes Line, Reading List 65&10@65&10&10%
Coat and Hat, Stowell's .....70&5%
Coat and Hat, Reading.....70@75%
Coat and Hat, Sargent's List.....50&10%
Coat and Hat, Wrightsville list...70&10%
Harness, Reading List.....70&10@75%

Wire—

Belt.....80&10@80&20%
Atlas, Coat and Hat.....50@50&10%
Wire Coat and Hat:
Acme.....60@60&5%
B. B.....70@70&5%
Gem.....60@60&5%
Bright Wire Goods—See *Wire.*

Wrought Iron—

Box, or Case, Octagon Steel.... doz. $2.00@2.15
Cotton.....doz. $1.00@1.10
Picture, T. & S. Mfg. Co.....75%
Tassel, T. & S. Mfg. Co.....50&10%
Wrought Staples, Hooks, &c.—See *Wrought Goods.*

Miscellaneous—

Bush, Light, doz. $5.00; Medium, $5.50; Heavy, $6.00

Grass.....Nos.	1	2	3	4
Best	$1.60	1.75	2.00	
Common	$1.50	1.50	1.50	1.75

Potato and Manure ..... 75¢15%
Whiffletree.....lb. 4½c
Hooks and Eyes:
Brass.....70¢10@75%
Malleable Iron.....75¢10%
Covert Saddlery Works' Self Locking Gate and Door Hook, 4 in. ₩ gross $13.00; 6 in. $17.20.....70%
Crown Picture.....60%
Bench Hooks—See *Bench Stops.*
Corn Hooks—See *Knives, Corn.*

Horse Nails—See *Nails, Horse.*

Horseshoes—

See *Shoes, Horse.*

Hose, Rubber—

Garden Hose, ¾-inch:
Competition.....ft. 4 @ 5 c
3-ply Standard.....ft. 5½@ 6 c
4-ply Standard.....ft. @ 6½c
3-ply extra.....ft. 6½@ 7 c
4-ply extra.....ft. 7½@ 8 c
High Grade.....ft 8½@10 c
Cotton Garden, ¾-in., coupled:
Low Grade.....ft. 5½c
Fair quality.....ft. 7 c
Good quality.....ft. 8 @ 8½c

Irons—

Sad—

From 4 to 10..... ..... lb. 2 25@2.50c
B B. Sad Irons.....lb. 2¾c
Chinese Laundry..... ..lb. 4¼@4¼c
Chinese Sad.....lb. 3½c
Mrs. Potts', per set:

Nos	50	55	60	65
	63@66c	59@62c	73@76c	69@72c

New England Pressing ..... .lb. 3c

Soldering—

Soldering Coppers..... lb. 21@25c
Covert Mfg. Co..... .. 35&2%

Pinking—

Pinking Irons.....doz 55@60c

Jack Screws—See *Screws.*

Jacks, Wagon—

Covert Mfg. Co., Steel.....45&2%
Daisy, ₩ doz. $12.00.....70%
Lockport.....40@40&10%
Victor, ₩ doz. $20.00.....70%
Lane's Steel.....30%

Kettles—

Brass, Spun, Plain, list Jan. 10, '99 15@20%
Enameled and Tea—See *Ware, Hollow.*

Knife Sharpeners—

See *Sharpeners, Knife.*

Knives—

Butcher, Shoe, &c.—

Dick's Butcher Knives 40%
Foster Bros.' Butcher, &c.....40%
Nichols' Butcher Knives.....50%
Table and Pocket Cutlery and John Wilson's Butcher Knives—Net prices.
Hay and Straw—See *Hay Knives.*

Corn—

Ft. Madison Cut-Easy, ₩ doz.....$3.25

Drawing—

Standard List.....75&10@30%
Adjustable Handle.....25@33⅓%
Bradley's.....35%
Douglass.....75@75&10%
Watrous.....30&10@40%
L. & I. J. White.....20&5@25%
Cautelo's Folding.....50@50&5%

Hay and Straw—

Blizzard.....$5.50@6.00
Iwan's Sickle Edge.....₩ doz. $10.50
Lightning, from Jobbers.....$5.00@6.00

Mincing—

Buffalo Adjustable, ₩ doz. $3.00....40%
Smith's, ₩ doz., Single, $2; Double, $3 45&50%

Miscellaneous—

Farriers'..... *doz. $2 00@3.00*
Wostenholme's.....₩ doz. $3.00@3.25

Knobs—

Base, 2¼-inch, Birch, Rubber tip, gro..... .....$1.25@1.30
Carriage, Jap, all sizes..gro. 27@30c
Door, Mineral.....doz. 60@62c
Door, Por. Jap d.....doz. 65@67c
Door. Por. Nickel....doz. $1 70@1.80
Bardsley's Wood Door, Shutter, &c...15%
Picture, Sargent's.....70&10%
Yale & Towne Wood, list Dec., '85....40%

Ladles—Melting—

P., S. & W.....35&10@40%
Reading.....50&10%
Sargent's.....60@60&10%

Lanterns—Tubular—

	Doz.	
Regular Tubular	$7.00	40&5@
Side Lift Tubular	$7.50	40&10@5%
Square Lift Tubular	$7.50	

Bull's Eye Police—

2¼-inch flash light.....doz. $4.00
3-inch flash light .....doz. $4.50
2¾ inch regular.....doz. $3.60
3-inch regular.....doz. $5.90

Latches, Thumb—

Roggin's Latches.....doz. 28c@30c

Lawn Mowers—

See *Mowers, Lawn.*

Leaders, Cattle—

Small.....doz. 45c; *large. 50c*
Covert Mfg. Co.....45&2%

Lemon Squeezers—

See *Squeezers, Lemon.*

Lifters, Transom—

Dickson:
3 x 4 it. x ¼ ..... ₱ 100 $10.00
Other s z-s Iron ..... 70&10&10%
Other sizes, Brass ..... 70&10%
Excelsior ..... 60@60&10%
Payson's:
Solid Grip Nos. 303 and 304, ₱ 100, $11.00
Other sizes ..... 70&10%

Lines—

Wire Clothes, Nos... 18 19 20
100 feet $2.50 2 25 2 00
75 feet $1.50
Ossawan Mills.
Crown Solid Braided Chalk 33⅓%
Mason's, No. 0 to No. 5 ..... 33⅓%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00: No. 3, $7.50
₱ gr 30%

Locks, &c.— Cabinet—

Cabinet Locks ..... 33⅓&2%

Door Locks, Latches, &c.—

[Net prices are very often made on these goods.]
Reading ..... 60@60&10%
R. & E. Mfg. Co. ..... 50&10@60&5%
Sargent & Co. ..... 30@60&10%
S. B. & Co., Locks, Knobs, &c. 40@40&5%

Elevator—

Stowell's 33⅓%

Padlocks—

Wrought Iron, list Dec. 3, '97 ..... 75@75&10%
Dog Collar, S. B. Co 40%
R. & E. Mfg. Co. Wrt. Steel a d Brass 50%
S. B. & Co 40%

Sash, &c.—

Fitch's Patent ..... 65&10%
Ives' Patent ..... 65@65&10%
Payson's Perfect 70%
Payson's Signal ..... 70&10%
Reading ..... 60&10&10@70%

Machines—

Boring—

Without Augers.

	Upright.	Angular.
Douglas	$2.50	$3.00
Jennings'	3.50	3.00
Millers' Falls	....	5.75
Snell's, Rice's Pat.	2.50	2.75

Fluting—

Crown Jewel, 6 in ..... $2.50@2.75

Hoisting—

Moore's Anti-Friction Differential Pulley Block 30%
Moore's Hand Hoist, with Lock Brake 20%

Washing—

Wayne American, No. 2, ₱ doz.	$37.50	Carload lots 10% off, freight allowed.
Western Star, No. 2, ₱ doz.	27.50	
Western Star, No. 3, ₱ doz.	30.00	
St. Louis, No. 41, ₱ doz.	68.00	

Mallets—

Hickory ..... 50@50&10%
Lignumvitæ ..... 50@50&10%
Tinners', Hickory and Applewood, doz ..... 55@60c
Fiber Head, Stearns' 25%

Mattocks—

List Feb. 23, 1899 ..... 70@70&10%

Meat Cutters—

See *Cutters, Meat.*

Milk Cans—See *Cans, Milk.*

Mills— Coffee—

Box and Side, list Jan. 1, '88 ..... 60&10@60&10&10%

Net prices are often made on some goods which are lower than above discounts.

Enterprise Mfg. Co., list Jan. 17, '93 ..30%
National, list Jan. 1, '94 ..... 30%
Parker's Columbia and Victor ..... 60&10%
Parker's Upright ..... 30&10@40%
Swift, Lane Bros. 33⅓%

Mincing Knives—

See *Knives, Mincing.*

Molasses Gates—

See *Gates, Molasses.*

Money Drawers—

See *Drawers, Money.*

Mowers, Lawn—

Net prices are generally quoted.

	10	12	14	16-inch
Cheap	$1.65	$1.70	$1.75	$1.80
Medium ...	2.50	2.75	3.00	3.25
High Grade	3.50	3.75	4.00	4.25

Pennsylvania and Continental ..... 60&10&10%
Philadelphia:
All Styles except A and E .. ....70&10%
Style A, all Steel ..... 60&10%
Style E, Low Wheel ..... 60&10%
Style E, High Wheel ..... 70&10%
Racine ..... 60&10&10%

Nails—

Cut and Wire, See Trade Report.
Wire Nails and Brads, Papered. List May 1, '92. .. . 85@85&5%
Hungarian, Finishing, Upholsterers', &c. See *Tacks.*

Horse—

Nos.	6	7	8	9	10	
A. C.	25¢	23¢	22¢	21¢	21¢	40&10&5%
American	9½	9½	9½	9½	9½	...net
Ausable	28¢	26¢	25¢	24¢	23¢	40&10&10%
Capewell	19¢	18¢	17¢	16¢	16¢	10&5%
C. B. K.	25¢	23¢	22¢	21¢	21¢	...40%
Champlain	28¢	26¢	25¢	24¢	23¢	40&5&2%
Clinton Fin.	19¢	17¢	16¢	15¢	14¢	30&5%
Maud S.	25¢	23¢	22¢	21¢	21¢	50&10&5%
Neponset	23¢	21¢	20¢	19¢	18¢	...40%
Putnam	23¢	21¢	20¢	19¢	18¢	33⅓%
Vulcan	23¢	21¢	20¢	19¢	18¢	...25%

Picture—

	1½	2	2½	3	3½ in.
Brass Head.	.90	.95	1.00	1.05	1.10 gro.
Por. Head...	.85	.90	.95	1.10	1.15 gro.

Nippers, See *Pliers and Nippers.*

Nut Crackers—

See *Crackers, Nut.*

Nuts—List Feb. 1, 1899.

List Feb. 1, '99.
Cold Punched. Off
Mfrs. or U. S. Standard, list.
Hexagon, plain 6.20c
Square, plain 5.90c
Square, C. T. & R. 6.00c
Hexagon, C. T. & R. 6.70c
Hot Pressed:
Mfrs., U. S. or Nar. Gauge Stan'd.
Square $6.20
Hexagon 6 90

Oakum—

Best or Government ..... lb. 5¾c
Navy ..... lb. 4¾c
U. S. Navy ..... lb. 5¼c
Plumbers' Spun Navy 8¾c
In carload lots ¼c lb. off f.o b. New York.

Oil Tanks—See *Tanks, Oil.*

Oilers—

Brass and Copper ..... 60&10@60%
Zinc and Tin ..... 70@70&10%
Malleable, Hammers' Improved, No. 1, $3.60; No. 2, $4; No. 3, $4.40 ₱ doz. 20%
Malleable, Hammers' Old Pattern, same list ..... 50&10%
Wilmot & Hobbs Mfg. Co. ..... 70&10@75%

Openers, Can—

French ..... doz. 35c
Iron Handle ..... doz. 60@75c
National, ₱ gro ..... $1.75@$2.00
Sardine Scissors ..... ₱ doz. $2.00@$2.10
Sprague, Iron or Wood Handles ..... ₱ doz. 40@45¢
Stowell's ..... 75&10%

Packing—

Rubber—

Standard, fair quality ..... 70&10@75%
Inferior quality ..... 75&10@80%
Extra ..... 60&5@60&10&5%
Jenkins' Standard, ₱ ℔ 80¢ ..... 25@25&5%

Miscellaneous—

American Packing ..... 9@10c lb.
Cotton Packing ..... 13@14c lb.
Italian Packing ..... 10½@11¼c lb.
Jute ..... 5@5½c lb.
Russia Packing ..... 12@13c lb.

Pails—

Creamery—

S. S. & Co., with gauges .. No 1 $5.25; No. 2, $5.50 ₱ doz 15%

Galvanized—

Inch	10	12	14
Water, Standard, gro	$18.00	$21 00	$24.00
Water, Competition, gro	17.00	19.50	22.00
Fire, gro	22.00	25.00	28.00
Well, gro	23.00	25.00	27.00

Pans—

Dripping—

Large Sizes ..... lb. 4 @4¼c
Small Sizes ..... lb. 4½@4¾c

Fry—

Standard List ..... 80@80&10%
Acme Fry Pans ..... 75@75&10%

Roasting and Baking—

Columbian, S. S. & Co., Nos. 5, ₱ doz. $10: 10, $11.50: 20, $13; 30, $15 ....60%
Simplex No. 08, ₱ doz. $7.00; No. 09, $8.50 ..... 60%

Paper—

Building Paper—

	Per roll
Rosin Sized Sheathing:	500 sq. ft.
Light wt., 20 sq. ft. to lb.	$0 35@0.40
Medium wt., 12 sq. ft. to lb	$0.55@0.60
Heavy wt , extra quality	$0.95@1.05
Barrett's Water Proof Sheathing..	$1 35@1.75
Medium Grades Water Proof Sheathing	$0 80@1.25
Deafening Felt, 9, 6 and 4½ sq. ft. to lb., ton	$42.50

Tarred Paper.

1 ply (roll 300 sq ft), ton $35 00@$37.00
2 ply, heavy, roll 100 sq. ft 90c
2 ply, light, roll 100 sq. ft ..... .75c
3 ply, heavy, roll 100 sq. ft $1 20
3 ply, light, roll 100 sq. ft $1.00

Sand and Emery—

List April 19, 1898 ..... 50&10&5@60%

Parers—

Apple—

Advance	₱ doz.	$4.50
Baldwin	₱ doz.	$5.00
Bonanza	each	$5.00
Dandy	each	$7.50
Eureka, 1888	each	$16.00
Family Bay State	₱ doz.	$12.00
Hudson's Li tle Star	₱ doz.	$4.00
Hudson's Rocking Table	₱ doz.	$5.50
Improved Bay State	₱ doz.	$27.00@30.00
New Lightning	₱ doz.	$5.50
Reading 72	₱ doz.	$4.00
Reading 78	₱ doz.	$7.00
Turn Table	₱ doz.	$4.50
White Mountain	₱ doz.	$4.00

Potato—

Saratoga	₱ doz.	$5.50
White Mountain	₱ doz.	$4.50

Paris Green—

Arsenic, kegs or casks.. lb. 12 @12½c
Kegs of 100 to 175 pounds. ..... lb. 12½@13 c
Kits of 14, 28 and 56 pounds ..... lb. 13½@14 c
Paper boxes 2 to 5 pnds.. lb. 13½@ 14c
Paper boxes 1 pound.. lb. 14 @14½c
Paper boxes ½ pound.. lb. 15 @15½c
Paper boxes ¼ pound.. lb. 16 @16½c

Picks and Mattocks—

List Feb 23, 1899 ..... 70@70&10%

Pinking Irons—

See *Irons, Pinking.*

Pins—

Escutcheon—

Brass ..... 60@60&5%
Iron, list Nov. 11, '85 ..... 60@60&5%

Pipe, Cast Iron Soil—

Factory Shipments.

Standard, 2-6 in 70%
Extra Heavy, 2-6 in ..... 70&5%
Fittings 75%

Pipe, Wrought—

Factory Shipments.
List February, 1899.
Plain and Galvanized:
Carload lots ..... 60&10&10&10&5%
Less than carload lots ..... 60&10&10&10%
Screw and Socket Casing, ... 52½@5%
Inserted Joint Casing ..... 47½&5%
Cold Drawn Seamless Steel Tubing.. 60%

Planes and Plane Irons—

Wood Planes—

Molding ..... 45@45&5%
Bench, First quality ..... 50&5@50&10%
Bench, Second quality ..... 50&10&5@60%
Bailey's (Stanley R. & L. Co) 50&10&10@50&10&10&10%
Gage Self Setting 35%

Iron Planes—

Bailey's (Stanley R. & L. Co) ..... 50&10&10@50&10&10&10%
Chaplin's Iron Planes ..... 50&10%
Miscellaneous Planes (Stanley R. & L. Co.) ..... 25&10&10@25&10&10&10%
Sargent's ..... 60&10&10@70%

Plane Irons—

Standard List ..... 30&10@30&10&10%
Buck Bros 30%
Butcher's ..... $5.00@5.25 to 2
Stanley R. & L. Co... 50&10@50&10&10%
L. & I. J. White ..... 20&5@25%

Plates—

Felloe ..... lb 3½@3¾c
Self-Sealing Pie Plates (S. S. & Co.), ₱ doz. $2.00 ..... 50%

Pliers and Nippers—

	Gas.... 7	8	9	10-in.	
Best	$5 25	$6.00	$6 50	doz.	
Good	$2.50	2.75	3.00	3.50	doz.
Acme Nippers					50%
Bernard's:					
Parallel Pliers, &c					33⅓%
Paragon Pl ers					50%
Lodi Pliers					50%
Elm City Fence Pliers					35%
Button's					70&10@70&10&5%
Heller's Farriers' Pincers and Tools					40@40&5%
Morrill's Parallel, ₱ doz. $12.00					30&5%
P. S. & W. Cast Steel					50@50&5%
P. S. & W. Tinners' Cutting Nippers, add 6%					10%
Utica Drop Forge & Tool Co.:					
Combination Pliers					40&5%
Side Cutting Pliers					40&5%
Hall Patent Nipper					40&5%
Round and Flat Nose Pliers					40&5%
End Cutting Pliers					40&5%
Royal Blue					40&5%
Glass Pliers					40&5%
Burner Pliers					40&5%

Plumbs and Levels—

Plumbs and Levels ..... 70&10&10@70&10&10&10%
Disston's 70%
Pocket Levels ..... 75&10&10@75&10%
Stanley R. & L. Co ..... 70&10&10@70&10&10&10%
Stanley's Duplex ..... 25&10@25&10&10%
Woods' Extension 33⅓%

Poachers, Egg—

Buffalo Steam Egg Poachers, ₱ doz., No. 1, $4.00; No. 2, $9.00; No. 3, $9.00; No. 4, $12.00 ..... 50%

Points, Glaziers'—

Bulk and 1 lb. papers.. lb. 10½@11¼c
½-lb. papers ..... lb. 11 @12 c
¼-lb. papers ..... lb. 11½@12½c

Pokes, Animal—

Ft. Madison Hawkeye ..... ₱ doz. $3.00
Ft. Madison, Western ..... ₱ doz. $3.50
Metallic Horse Poke ..... ₱ doz. $5.00

Police Goods—

Manufacturers' Lists ..... 25@25&10%
Tower's 25%

Polish—Metal—

Prestoline Liquid, No. 1 (¼ pt.), ₱ doz. $3.00; No. 2 (1 qt.), $9.72 ..... 40%
Prestoline Paste ..... 33⅓@40%
U. S. Metal Polish Paste, 3 oz. boxes, ₱ doz. 50¢; ₱ gr. $4.50; ½ ℔ boxes, ₱ doz. $1.25; 1 ℔ boxes, ₱ doz. $2.25.
U. S. Liquid, 8 oz. cans, ₱ doz. $1.25; ₱ gr. $12.00.
Barkeepers' Friend Metal Polish, ₱ doz. $1.75; ₱ gr. $18.00.
Wynn's White Silk, ½ pt. cans, ₱ doz. $1.50

Stove—

Joseph Dixon's, ₱ gr. $5.75 ..... 10%
Dixon's Plumbago ..... ₱ ℔ 8¢
Fireside ..... ₱ gr. $2.50
Gem, ₱ gr. $4.50 ..... 10%
Japanese ..... ₱ gr. $3.50
Jet Black ..... ₱ gr. $3.50
Wynn's Black Silk, 5 ℔ pail ..... ₱ ℔ 12¢
Wynn's Black Silk, ½ ℔ box, ₱ doz. $1.00
Wynn's Black Silk, 5 oz. box, ₱ doz. $0.75
Wynn's Black Silk, 8 oz. liq., ₱ doz. $1.00

Poppers, Corn—

Round or Square:
1 qt ..... gro. $6.00
1½ qt ..... gro. 8.00
2 qt ..... gro. 10.00
Quincy Corn Popper, 1 qt., ₱ gr. $17.00; 2 qt., $22.00.

Post Hole and Tree Augers and Diggers—

See also *Diggers, Post Hole, &c.*

Potato Parers—

See *Parers, Potato.*

Pots— Glue—

Enameled ..... 40c&10c&5@50%
Tinned ..... 40c&5@40c&10%

Powder—

In Canisters:
Duck, 1 lb. each 45c
Fine Sporting, 1 lb. each 75c
Rifle, ½-lb. each 15c
Rifle, 1-lb. each 25c
In Kegs:
Duck, 6¼-lb. kegs $2.25
Duck, 12½-lb kegs $4.25
Duck, 25-lb kegs $8.00
Rifle, 6¼-lb kegs $2.25
Rifle, 12½-lb. kegs $4.25
Rifle. 25-lb. kegs $8.00
King's Smokeless: 20&2½%
Keg (25 ℔ bulk) $20 00
Half Keg (12½ ℔ bulk) $10.25
Quarter Keg (6¼ ℔ bulk) $5.25
Canister (1 ℔ bulk) $0.90
Case, 1 ℔ Canisters (50 ℔ bulk) $45.00
Half Case, 1 ℔ Canisters (25 ℔ bulk) $22.75
King's Semi-Smokeless: 20&2½%
Keg (25 ℔ bulk) $16.00
Half Keg (12½ ℔ bulk) $8.25
Quarter Keg (6¼ ℔ bulk) $2.75
One Pound Can, bulk $0.50

Presses—

Fruit and Jelly—

Enterprise Mfg Co ..... 25@30%

Pruning Hooks and Shears—See *Shears.*

Pullers, Nail—

Crown, ₱ doz. $18.00 ..... 50%
Crown Prince, ₱ doz. $15.00 ..... 50%
Giant, No. 1, ₱ doz. $18; No. 2, $16.50; No. 3, $15 ..... 40%
Nauvoni, ₱ doz. $24.00 ..... 40%
Pelican, ₱ doz. $9.00 ..... 15&10%
Scranton No. 1 and 2, ₱ doz. $10.00
Scranton, No. 3, ₱ doz. $9.50

Pulleys—

Hay Fork, Swivel or Solid Eye..... doz. $1.50

Hay Fork, Stowell's Anti-Friction, 5-in. Wheel, ₱ doz. $12.00..... 40%
Hay Fork, Stearns' No. 15 & 25 ₱ doz. $1.75
Hay Fork, Stearns' No. 35 & 45 ₱ doz. $2.00
Hay Fork, Stearns' Nos. 56 & 66..... $2.25
Hot House, Awning, &c..... 60@60&10%
Japanned Clothes Line..... 60@60&10%
Japanned Screw..... 70&10&10%
Japanned Side..... 70&10&10%
Stowell's Ceiling or End, Anti-Friction 40%
Stowell's Dumb Waiter, Anti-Friction 50%
Stowell's Electric Light..... 33⅓%
Stowell's Side, Anti-Friction..... 50%
Sash (Auger Mortise):
Common Sense, 1¾ in., ₱ doz., 18¢; 2 in., 20¢.
Empire..... 1¾ in., 17¢; 2 in., 19¢
L. C..... 1¾ in., 15¢; 2 in., 17¢
Ideal No. 13..... 1¾ in., ₱ doz., 15½¢
Improved..... 1¾ in., 17¢; 2 in., 19¢
Niagara..... 1¾ in., 16¢; 2 in., 17¢
No. 36, Troy..... 1¾ in., 15¢; 2 in., 17¢
Star..... 1¾ in., 16¢; 2 in., 17¢
Acme..... 1¾ in., 18¢; 2 in., 19¢
Tackle Blocks—See *Blocks.*

Pumps—

Cistern ..... 65@65&10%
Pitcher Spout ..... 75@75&10%
Pump Leathers, all sizes.....gro. $6.00
Flint & Walling's Fast Mail..... 60%
Myer's Pumps, low list 55%
Contractors' Rubber Diaphragm Non-chokable, B. & L. Block Co..... 20%

Punches—

Revolving.....doz. $3.50@3.75
Saddlers' or Drive, good...doz. 60@65c
Spring, good quality.....$1.70@1 80
Bemis & Call Co.'s Cast Steel Drive. 50&5%
Bemis & Call Co.'s Check..... 55%
Bemis & Call Co.'s Spring..... 50&5%
Bemis & Call Co.'s Springfield Socket.. 65%
Niagara Hollow Punches..... 45%
Niagara Solid Punches..... 55%
Spring, Leach's Pat..... 15%
Steel Screw, B. & K. Mfg. Co..... 50%
Tinners' Hollow, P., S. & W. Co.....20&2%
Tinners' Solid, P., S. & W. Co., ₱ doz., $1.44..... 55%

Rail—

Barn Door, &c.—

Barn Door, Light...In.	½	⅝	¾
100 feet.....	*$1.50*	*$1.95*	*$2.60*
B. D., for N. E. Hangers:	*Small.*	*Med.*	*Large.*
100 feet.....	*$1.60*	*2.00*	*2.50*

Sliding Door, Bronzed Wr't Iron, ft. 6½c
Sliding Door, Iron Painted..3¼@3½c
Sliding Door, Wrought Brass, 1½ in..... lb. 56c..80%
Cronk's Double Braced Steel Rail, ₱ foot..... 3¢
Lanes' O. N. T., ₱ 100 ft..... $2.40
Lanes' Standard, ₱ ft..... 3¼¢
McKinney's None Better..... ₱ ft. 2¾¢
McKinney's Standard..... ₱ ft. 3¼¢
Moore's, Wr't. Bracket, Steel..... $2.40
Stowell's Steel Rail..... 35&10%
Terry's Steel Rail..... ₱ ft. 3¼¢

Rakes—

1895 or old list often used:
C. S Rakes..... 60&10&2%
Malleable Rakes..... 70&10&5%
Association List:
Cast Steel..... 75&5&2%
Malleable..... 70&10%
Fort Madison Red Head Lawn.....$3.00
Fort Madison Blue Head Lawn.....$2.65

Rasps, Horse—

Disston's 75%
New Nicholson Horse Rasp.....70&10%
See also *Files.*

Razor Strops—

See *Strops, Razor.*

Reels—

Clothes Line—

Stearns'..... 33⅓&10%

Fishing—

Hendryx Aluminum, German Silver, Gold, Bronze, Silver, Rubber, Popolo and Salmon, Single Action, Multiplying and Quadruple, all sizes..... 25%
Hendryx Single Action Series, 102P and PN, 202P and PN, 102 PR and PRN, 202 PR and PRN, 304 P and PN, 00304P and PN, 502 and 502N, 802 and 802N, 02084N, Competitor. 50%
Hendryx Multiplying and Quadruple Series, 3004N and PN, 4N and PN, 2904N, 2904P and PN, 002904PN, 0924 and 0924N, 5009N and PN..... 40&10%

Registers—

For points on Mississippi River and East:
Black Japanned..... 50%
White Japanned..... 50%
Bronzed Finishes..... 40%
Nickel Plated..... 50%
Electro Plated in Brass, &c..... 40%
White Porcelain..... 30%
Solid Brass and Bronze Metal.. 25%
Note.—Higher prices are quoted in territory further West.

Rings and Ringers—

Bull Rings—

	2	2½	3 Inch.
Steel.....	*$0.90*	*1.00*	*1.05 doz.*
Copper.....	*1.10*	*1.20*	*1.35 doz.*

Hog Rings and Ringers—

Hill's Rings....gro. boxes, $3.25@3.50
Hill's Ringers, G. I.....doz. 50@55c
Blair's Rings..... ₱ gro. $3.75@4.00
Blair's Ringers..... ₱ doz. 55¢@60¢
Brown's Rings..... ₱ gro. $3.75@4.00
Brown's Ringers..... ₱ doz. 55¢@60¢
Perfect Rings..... ₱ gro. $7.00@7.50
Perfect Ringers, ₱ doz..... 75@80¢

Rivets and Burrs—

Copper..... 40&10@50%
Iron or Steel:
Tinners'..... 65@65&10%
Miscellaneous..... 65@65&10%
Note.—See Trade Report.

Rivet Sets—See *Sets.*

Roasting and Baking Pans—See *Pans, Roasting and Baking.*

Rollers—

Acme, Stowell's Anti-Friction....50&10%
Barn Door, Sargent's list. 60&10&10@70%
Lane's, Stay ..... 33⅓&5%
Stowell's Barn Door Stay...₱ doz. $1.00

Rope—

Manila, 7-16 in. and larger. lb. ..@ 9¾c
Manila.....9/16 inch. lb. ..@10¼c
Manila... ¼ and 5-16 in. lb. ..@10¾c
Manila, Tarred Rope, 15 thread..... lb. ..@ 9¾c
Manila Hay Rope Med'm. lb. ..@ 9¾c
Sisal..7-16 in. and larger. lb. ..@ 8¾c
Sisal..... .....9/16 inch. lb. ..@ 9¼c
Sisal.....¼ and 5-16 in. lb. ..@ 9¾c
Sisal, Hay Rope, 2 to 10 ply..... lb. ..@ 8¾c
Sisal, Med'm Lath Yarn. lb. ...@ 8¼c
Cotton Rope:
Best, ¼-in. and larger..lb. 13@14 c
Med'm, ¼-in. and larger lb. 10@12 c
Com., ¼-in. and larger. lb. 8@10 c
Jute Rope..... lb. 5½@6 c

Wire Rope—

List Sept. 1, '94. All kinds. 7½&2½&2%

Ropes, Hammock—

Covert Saddlery Works..... 70%

Rules—

Boxwood..75¢10¢10¢10@75¢10¢10 ¢10¢10¢10%
Ivory ...40¢10¢10@40¢10¢10¢10¢10%
Lufkin's Steel..... 50&10%
Lufkin's Lumber ... . 50&10%
Stanley R. & L. Co.:
Boxwood ..... 75&10&10@75&10&10&10&10%
Ivory..... .40&10&10@40&10&10&10%

Sad Irons—See *Irons, Sad.*

Sand and Emery Paper and Cloth—

See *Paper and Cloth.*

Sash Cords—See *Cord, Sash.*

Sash Locks—See *Locks, Sash.*

Sash Weights—

See *Weights, Sash.*

Sausage Stuffers or Fillers—See *Stuffers or Fillers, Sausage.*

Saws—

Note.—Extra 5@10% often given on Circulars. Cross Cuts, &c., and extra 5@7½ on Hand. Butcher, &c.
Atkins' Circular..... 50%
Atkins' Band..... 50%
Atkins' Cross Cuts..... 40%
Atkins' Mulay, Mill and Drag..... 50%
Atkins' One-Man Saw..... 40&10%
Atkins' Wood Saws ..... 40&10%
Atkins' Hand, Compass, &c..... 40%
Disston Circular Solid and Inserte: Tooth..... 50%
Disston Band 2 to 14 in. wide..... 60%
Disston Band ¾ to 1¾..... 70%
Disston Crosscuts..... 50%
Disston Narrow Crosscuts..... 55%
Disston Mulay, Mill and Drag..... 50%
Disston Framed Woodsaws..... 35%
Disston Woodsaw Blades..... 40%
Disston Woodsaw Rods..... 25%
Disston Handsaws, Nos. 12, 99, 9, 16, d100, D8, 120, 79, 77, 8..... 25%
Disston Hand Saws, Nos. 7, 107, 10⅞, 3, 1, 0, 00, Combination..... 30%
Disston Compass, Keyhole, &c..... 25%
Disston Butcher Saws and Blades.... 35%
C. E. Jennings & Co.'s..... 35&5&2&0&5%
Peace Circular and Mill..... 45&10%
Peace Cross Cuts, list Jan. 1, '93, 45&10&5%
Peace Hand, Panel and Rip.... 25&10&5%
Richardson's Circular and Mill....45&10%
Richardson's X Cuts, list Jan. 1, '93. 45&10&5%
Richardson's Hand, &c..... 25&10&5%
Simonds' Circular Saws..... 45@50%
Simonds' Crescent Ground Cross Cut Saws..... 35%
Simonds' One-Man Cross Cuts....40&10%
Simonds' Gang Mill, Mulay and Drag Saws..... 45@45&5%

Hack Saws—

Disston Concave Blades..... 25%
Disston Keystone..... 30%
Disston Hack Saw Frames..... 30%
Griffin's complete..... 50@50&10%
Griffin's Hack Saw Blades....50@50&1 %
Star Hack Saws and Blades..... 15&10%

Scroll—

Barnes' No. 7, $15..... 25%
Barnes' Velocipede Scroll Saw, $18....20%
Barnes' Scroll Saw Blades..... 40%
Lester, complete, $10.00..... 15&10%
Rogers, complete $4.00..... 15&10%

Saw Frames—

See *Frames, Saw.*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Scale Beams—

See *Beams, Scale.*

Scales—

Family, Turnbull's ... ...30@30&10%
Hatch, Counter, No. 171, good quality ..... doz. $17.00@18.00
Hatch, Tea, No. 161...doz. $5.75@6.00
Union Platform, Plain....$2.00@2.10
Union Platform, Striped..$2.15@2 25
Chatillon's Eureka..... 25%
Chatillon's Favorite..... 40%
Chatillon's Grocers' Trip Scales..... 50%
Pelouze Scales—Family, Candy, Grocers' and Postal..... 33⅓%
"The Standard" Portables..... 45@50%
"The Standard" R. R. and Wagon....60%

Scrapers—

Box, 1 Handle ..... doz. $2.00
Box, 2 Handle..... doz. $3.00@4.00
Ship, No. 1, doz. $3.50; No. 2, $2.25@2.40
Adjustable Box Scraper (S. R. & L. Co.) $3.00..... 40&10%
Foot, W. E. Pratt Mfg. Co..... ₱ doz. $1.15@$1.25
Ship, R. I. Tool Co..... 10%

Screen Window and Door Frames—See *Frames.*

Screw Drivers—

See *Drivers, Screw.*

Screws—

Bench and Hand—

Bench, Iron.....doz. 1 in., $2.30; 1¼, $2.65; 1¼, $3.00
Bench, Wood, Beech..doz. $2.00@2.20
Hand, Wood.....30&10@40&10%
Hand, Grand Rapids..... 35%

Coach, Lag and Hand Rail—

Lag, Common Point, list Jan. 20, '95..... 80@80&10%
Coach and Lag, Gimlet Point, list Jan. 20, '95.....80&5@80&10&5%
Hand Rail, list Jan. 1, '81.... 82½&2%

Jack Screws—

Millers Falls..... 50&10&10%
Millers Falls, Roller ..... 50&10%
P., S. & W..... 40@40&10%
Sargent..... 70&10&10%
Stearns'..... 40&10%

Machine—

List Jan. 1, '98.
Flat or Round Head, Iron..... 60%
Flat or Round Head, Brass..... 50%

Set and Cap—

Set (Iron or Steel)..... 75@75&10%
Sq. Hd. Cap..... 70@70&10%
Hex. Hd. Cap..... 70@70&10%

Wood—

List Nov. 10, 1898.
Flat Head, Iron..... 85%
Round Head, Iron..... 82½%
Flat Head, Brass..... 80&10%
Round Head, Brass..... 75&10%
Flat Head, Bronze..... 75&10%
Round Head, Bronze..... 75%
Rogers' Drive Screws..... 85%
Note.—An extra 5 or 10% is often given.

Scroll Saws—See *Saws, Scroll.*

Scythes—

Grass and Grain..... 50&10%

Scythe Snaths—

See *Snaths, Scythe.*

Seeders—

Raisin—

Enterprise..... 25@30%

Sets—

Awl and Tool—

Brad Awl and Tool Sets:
Wood Hdle., 10 Awls.....doz. $2.00
Wood Hdle., 14 Awls, 6 Tools.... doz. $2.25@2.40
Aiken's Sets, Awls and Tools: No. 20, ₱ doz. $10.00, 50&10@60&10&5%
Fray's Adj. Tool H'dls...Nos. 1, $12; 2, $13; 3, $13; 4, $9; 5, $7..... 50%
Millers Falls Adj. Tool H'dls, No. 1 $12; No. 4, $12; No. 5, $18 .... 15&10%
Stanley's Excelsior: No. 1, $7.50; No. 2, $4.00; No. 3, $5.50..... 40&10@40&10&5%

Garden Tool Sets—

Ft. Madison Rakes, Shovel and Hoe.... ₱ doz.....$9.00

Nail—

Round, assorted.....gro. $3.00@3.50
Octagon..... gro. $4.00@4.75
Buck Brothers..... 27½%
Cannon's Diamond Point, ₱ gr. $12..25%
Snell's Corrugated, Cup Pt..... 50%
Snell's Knurled, Cup Pt..... 66⅔%

Rivet—

Regular list..... 70@70&10%

Saw—

Aiken's Genuine..... ₱ doz. $4.50@5.00
Aiken's Imitation ..... ₱ doz. $3.00@3.10
Atkin's Criterion..... ₱ doz. $6.00
Atkin's Adjustable..... ₱ doz. $6.00
Bemis & Call Co.'s Cross Cut..... 30&5%
Bemis & Call Co.'s Plate..... 20%
Bemis & Call Spring Hammer..... 30&5%
Disston's Star and Mona ch..... 25%
Hammer, Bemis & Call Co.'s now Pat. 45%
Morrill's No. 1, $15.00..... 40&20%
Nos. 3 and 4, Cross Cut, $23.00. 40&20%
No. 5, Mill, $31.00..... 40&20%
No. 10, $15.50..... 40&20%
No. 11, $16.00..... 40&20%
Stillman..... ₱ doz. $1.00
Taintor Positive, ₱ doz. $18 ..... 60%

Sharpeners, Knife—

Tanite Mills ₱ gross, $14.40....25@33⅓%

Shaves, Spoke—

Iron.....			*doz. $1 00@1 25*
Wood.....			*doz. $1 75@2.00*
Bailey's (Stanley R. & L. Co.).....			50&10%
Goodell's, ₱ doz. $9.00.....			15&10%
Stearns'.....			40&10%

Shears—

Cast Iron....	*7*	*8*	*9 in.*
Best	*$16.00*	*18.00*	*20.00 gro.*
Good.....	*$13.00*	*15.00*	*17 00 gro.*
*Cheap.... *	*$9.00*	*10 00*	*11.00 gro.*

Straight Trimmers, &c.:
Good quality.....70¢10@75¢10%
Second quality..... .....80¢10@85%
Acme Cast Shears..... 40@40&5%
Davenport Cutlery Co..... 60@60&10%
Heinisch's Tailors' Shears..... 40@40&5%
Seymour's, list Dec. '81..... 60&10&10@70&5%
Seymour's Nickel..... 50&10@60&5%
Seymour's Tailors' Shears..... 40@40&5%
Wilkinson's Hedge..... 50%
Wilkinson's Sheep..... 15%

Tinners' Snips—

Forged Handles, Steel Blades..20¢10% Malleable Handles, Laid with Steel. 40%
Forged Handles, Steel Blades, Berlin. 40¢10%
Niagara Snips..... 40%
Seymour's..... .....60&10&10@70&5%

Pruning Shears and Tools—

Disston's Combined Pruning Hook and Saw, ₱ doz. $18.00..... 25@25&10%
Disston's Pruning Hook, ₱ doz. $12.00 25@25&10%
John T. Henry Mfg. Company: Henry's Genuine, Nos. 1, 2 and 22 ..... 50&10%
Henry's Pattern, No. 20..... 50&25%
Henry's Pattern, No. 21 ..... 50&30%
Conn. Pattern, Nos. 32, 33 and 3. 50&25%
Conn. Pattern, No. 4..... 50&20%
Henry's Orange Shears..... 50&30%
Henry's Grape Shears..... ...60&20%
Henry's Tree Pruners..... 75%
P., S. & W. Co..... 60%
Seymour's..... 60&10&10@70&5%

Sheaves—Sliding Door—

Stowell's Anti-Friction..... 50%
Patent Roller..... .60&10@60&10&5%
Patent Roller Hatfield's, Sargent's list. 80&10@80&10&7%
Reading..... .....70&10@75%
R. & E..... 60&10@60&10&5%
Wrightsville, Hatfield Pattern....80&10%

Sliding Shutter—

Reading list..... 70&10@75%
R. & E..... 60@60&10%
Sargent's list..... 60@60&10%

Shells—

Brass Shot Shells, Club, Rival, Climax. 65&2%
Brass Shot Shells, first quality..... 60&2%
First quality 4, 8, 10 and 12 gauge. 25&10&2%
First quality Rival, Club and Climax brands, 14, 16 and 20 gauge ($7.50 list)..... 20&10&2%
New Victor, all gauges..... 15&2%
Quick Shot and League..... 33⅓&5&2%
Smokeless brand, 12, 10, 16 gauge.... 33⅓&10&2%
Star, Club, Rival and Climax Brands . 33⅓&10&2%
Trap brand, 12 and 10 gauge. 33⅓&10&2%

Shells, Loaded—

Loaded with Black Powder..... 40¢5@40¢10%
Loaded with Nitro Powder..... 40¢10¢10¢5@40¢10¢10¢10%
Loaded with Semi-Smokeless Powder..... 40¢5@40¢10%

Ship Tools—

L. & I. J. White 25%

Shoes, Horse, Mule, &c.—

Factory Shipments:
No. 2 and larger.....per 100 lbs., $3.35

Shot—

Drop, up to B, 25-lb. bag...$1.40@1.45
Drop, up to B, 5-lb. bag ..... .30
Drop, B and larger, 25-lb. bag.... $1.65@1.70
Drop, B and larger, 5-lb. bag..... .35
Buck, 25-lb. bag.....$1.65@1.70
Buck, 5-lb. bag..... .35
Chilled, 25 lb. bag.....$1.68@1.75
Dust Shot, 25 lb. bag..... 2.00
Dust Shot, 5-lb. bag..... .50
These prices are often shaded 5 @10c. 25 lb. bag, especially in the West, and merchants often undersell the manufacturers.

Shovels and Spades—

No. 2, Polished, Sq. or Rd. Point, D or L Handle:

	A1,	*B2.*
	1st Grade.	*2d Grade.*
Plain Back....	*$8.35@9.15*	*$7.95@8.25*
Strap Back.....	*8.25@8.55*	*7.35@7.65*
Cleveland Pat'n	*8.55@8.85*	*7.65@7.95*
	C3,	*D1,*
	3d Grade.	*4th Grade.*
Plain Back....	*$7.05@7.35*	*$6.45@6.75*
Strap Back.....	*6.45@6.75*	*5.85@6.15*
Cleveland Pat'n	*6.75@7.05*	*6.15@6.45*

All other sizes add 30c doz. Black deduct 30c doz.

Shovels and Tongs—

Brass Head.....60&10@60&10&10%
Iron Head.....60&10@60&10&5%

Sieves and Sifters—

Hunter's Imitation...gro. $9.00@9.50
Buffalo Metallic S. S & Co., ₱ gr.:

	16	16&18	18	18&20
Blued	$10.80	$11.40	$11.40	$12.00
Tinned	11.40	12.00	12.00	12.60

Eclipse.....₱ gr. $9.00@ 9.50
Hunter's Genuine....₱ gr. $10.00@10.50
Shaker (Barler's Pat.) Flour Sifters..
₱ doz., $2.00.....35%

Sieves, Wooden Rim—

	Iron.	Plated.
Mesh 18, Nested, doz	$0.70	$0 85
Mesh 20, Nested, doz	.90	1 05
Mesh 24, Nested, doz	1.05	1 20

Sinks—

Cast Iron—

High list..... 75&5@75&10%
Low list.....60&10&10@70%

Wrought Steel—

Columbus Galv'd and Enameled.50&10%
Columbus, Painted.....30&10%
L. & G.....50&10%

Slates—

"D" Slates.....50&10@50&10&10%
Unexcelled Noiseless Slates.....
60&6 10s@60&6 10s&5%
Wire Bound.....40&10@50%

Slaw Cutters—See *Cutters.*

Snaps, Harness—

German.....50@50&5%
Covert Mfg. Co.:
Derby.....45&2%
High Grade.....45&2%
Jockey.....45&2%
Trojan.....45&2%
Covert's Saddlery Works:
Banner.....75%
Crown.....70%
Triumph.....70%
W. & E. T. Fitch:
Bristol.....40&10%
Empire.....50&5%
National.....50&5%
Clipper.....50&10&5%
Champion.....40&10%
Victor.....60&5%
Sargent's Patent Guarded.....
70&10@70&10&10%

Snaths—

Scythe.....55%

Snips, Tinners'—See *Shears.*

Soldering Irons—

See *Irons, Soldering.*

Spoke Trimmers—

See *Trimmers, Spoke.*

Spoons and Forks—

Tinned Iron—

Basting, Cen. Stamp Co.'s list....
75&10@30%
Solid Table and Tea, Cen. Stamp Co.'s list.....70&25%

Silver Plated—

Flat Ware.....50&10@60&10%
Wm. Rogers M'g. Co.....50&10%

Miscellaneous—

German Silver.....60&10%
Wm. Rogers Mfg. Co.:
18% German Silver.....60%
Rogers' Silver Metal.....50&10%

Springs—

Door—

Gem (Coil).....20%
Rubber, complete.....₱ gro. $15.00
Star (Coil).....30%
Torrey's Rod, 39 in....₱ doz. $1.10@1.25
Warner's No. 1, ₱ doz. $1.50; No. 2, $3.40.....55@55&10%
Victor (Coil).....60&10@60&10&5%

Carriage, Wagon, &c.

Elliptic, Concord, Platform and Half Scroll, 60&10@60&10&10&10 or following net prices:

	Tempered. Blk.	Brt.	Oil Temper'd. Blk.	Brt.
1¼ in.	5½c	5¾c	6 c	6¼c
1⅜ in.	5½c	5¾c	6 c	6¼c
1½ in.	5¼c	5½c	5¾c	6 c

Cliff's Bolster Springs.....40&2%
Cliff's Seat Springs.....₱ pair 45¢

Sprinklers, Lawn—

Enterprise.....25@30%
Philadelphia No. 1, ₱ doz. $12; No. 2, $15; No. 3, $24.....35%

Squares—

Nickel plated.....
Steel and Iron.....
} *List May 1, '95*..
75&10@75&10&5%
Rosewood Hdl. Try Square and T-Bevels.....60&10&10@70%
Iron Hdl. Try Squares and T-Bevels.
40&10@40&10&10%
Disston's Try Sq. and T-Bevels....60&10%
Winterbottom's Try and Miter...50&10%

Squeezers—

Lemon—

Wood, Common, gro., No. 0, $5.00; No. 1, $6.50; No. 2, $10.00.
Wood, Porcelain Lined:
Cheap.....doz. $2.50@2.75
Good Grade.....doz. $3.00@3.50
Tinned Iron.....doz. $0.80@1.25
Iron, Porcelain Lined doz. $3.25@3.50
Jennings' Star.....₱ doz. $1.85@1.90
King.....₱ doz. $2.00

Staples—

Barbed Blind.....lb. 7¼@8c
*Electricians', Association list..*80&10%
Fence Staples, same price as Barbed Wire. See Trade Report.
Poultry Netting.....lb. 4@4½c
Grand Crossing Tack Co.'s list....75&10%

Steels, Butchers'—

Dick's.....40%
Foster Bros'.....40%
C. & A. Hoffmann's.....40%
Nichols Bros.....50%
John Wilson's, list Sept. 1, '94.....25%

Steelyards.....40@40&10%

Stocks and Dies—

Blacksmiths'.....35@40%
Gardner.....40&10%
Green River.....25%
Lightning Screw Plate.....25%
Little Giant.....25%
Reece's New Screw Plates.....25@30%
Reversible Ratchet.....25%

Stone—

Scythe Stones—

Pike Mfg. Co., list '95-'96.....33⅓%
Cleveland Stone Co., list Nov., '96..33⅓%

Oil Stones, &c.

Pike Mfg. Co.:
Hindostan No. 1, ₱ d...8¢
Sand Stone.....5¢
Turkey Oil Stone, Extra, 5 to 8 in.....80¢
Turkey Slips.....$2.00
} 33⅓@33⅓&10%
Lily White Washita.....60¢
Rosy Red Washita.....60¢
Washita Stone, Extra.....50¢
Washita Stone, No. 1.....40¢
Washita Stone, No. 2.....30¢
Lily White Slips.....90¢
Rosy Red Slips.....90¢
Washita Slips, Extra.....80¢
Washita Slips, No. 1.....70¢
Arkansas Stone, No. 1, 3 to 5½ in. $2.90
Arkansas Stone, No. 1, 5½ to 8 in. $3.50
} 33⅓@33⅓&10%
Tanite Mills:
Emery Oil, ₱ doz. $5.00.....50@60%

Stoners—

Cherry—

Enterprise.....25@30%

Stops, Bench—

Millers Falls.....15&10%
Morrill's...₱ doz., No. 1, $10.00; No. 2, $11.00, 40&20%
Stearns'.....30&5%

Stops, Window—

Taplin's.....45%

Stove Boards—

See *Boards, Stove.*

Stove Polish—See *Polish, Stove.*

Straps, Box—

Cary's Universal.....30&10&10%

Stretchers, Carpet—

Cast Iron, Steel Points....doz. 70@75c
Cast Steel, Polished.....doz. $2.25
Socket.....doz. $1.75

Stuffers, Sausage—

Miles' Challenge, ₱ doz. $20...50@50&5%
Enterprise Mfg. Co., list Jan. 17 '93....
25@25&7½%
National Specialty Mfg. Co., list Jan. 1, '97.....35%

Tacks, Brads, &c.—

List Jan. 15, '99.
Carpet Tacks:
American Blued.....90&30@90&35%
American Tinned....90&30@90&35%
*American Cut Tacks..*90&20@90&30%
Swedes Iron Tacks.....90&25@90&35%
*Upholsterers' Tacks.*90&40&10@90&50%
Gimp Tacks.....90&40&10@90&50%
Lace Tacks.....85&20@90%
Trimmers' Tacks.....90&30@90&30%
Looking Glass Tacks.....75%
Bill Posters' and Railroad Tacks....
90&25@90&35%
Hungarian Nails.....80&10@80&15%
Common and Patent Brads.75@75&5%
Trunk and Clout Nails:
Blued.....80&10%
Tinned.....80&10%

Miscellaneous—

Double Point Tacks.....90&10@...%
Steel Wire Brads, R. & E. Mfg. Co.'s list.....50&10@60%
See also *Nails, Wire.*

Tanks, Oil—

Emerald, S. S. & Co.....30-gal. $3.00
Emerald, S. S. & Co.....60-gal., $3.75
QueenCity S. S. & Co., 60-gal., each, $4.00; 100-gal., $6.25; 120-gal., $8.50; 200-gal., $14.00; 250-gal.. .. .. $17.75

Tapes, Measuring—

American Asses' Skin.....40&10@50%
Patent Leather.....25@25&10%
Steel.....33⅓@40%
Chesterman's.....25@25&5%
Keuffel & Esser Co., Steel and Metallic, new list, 1898.....35%
Lufkin's Steel and Metallic.....
33⅓@33⅓&5%

Thermometers—

Tin Case.....80&10%

Ties, Bale—Steel.

Standard Wire, list.....50&10&5%

Ties, Wall—

Cleveland, Steel.....₱ 1000, $10.00

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tire Benders, Upsetters, &c.—See *Benders and Upsetters, Tire.*

Tobacco Cutters—

See *Cutters, Tobacco.*

Tools—

Coopers'—

L. & I. J. White.....20@20&5%

Saw—

Atkins' new list.....40%
Simonds'.....33⅓%

Transom Lifters—

See *Lifters, Transom.*

Traps—Game—

Newhouse.....50&5@50&10%
Oneida Pattern.....80@80&5%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes.8@9c
Mouse, Round or Square Wire.....
doz. $0.85@1.00
Dandy.....₱ doz. $1.75
Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat.....₱ doz. $15.00
No. 3, Rat.....₱ doz. $5.85
No. 3½, Rat.....₱ doz. $4.50
No. 4, Mouse.....₱ doz. $4.30
No. 5, Mouse.....₱ doz. $3.00
Schuyler's Rat Killer, No. 1, ₱ gr. $13.50; No. 2, ₱ gr. $15.00
Out o' Sight, Mouse, No. 1, ₱ doz. 60¢; Rat, No. 2, $1.25; Mo'e, $6.00; Gopher, $1.50; Stop Thief, No. 1, $1.25; No. 2, $1.50.

Fly—

Balloon, Globe or Acme.....
doz. $1 25; gro. $11.50@15.00
Harper, Champion or Paragon
doz. $1.50; gro. $17.00

Trimmers, Spoke—

Bonney's No. 1, ₱ doz. $2.75; No. 2, $3.75
Douglas', ₱ doz. $9.00.....20%
Stearns'.....20&10%

Trowels—

Disston Brick and Pointing.....30%
Disston Plastering.....25%
Disston "Standard Brand" and Garden Trowels.....40%
Peace's Plastering.....25@25&5%
Rose Brick and Plastering...30@30&10%
Woodrough & McParlin, Pl'st'ring.25&10%

Trucks, Warehouse, &c.—

B. & L. Block Co.'s list.....40%
Daisy Stove Trucks, Improved pattern
₱ doz. $18.00

Tubs, Wash—

	No. 1	2	3
Galvanized, ₱ doz.	$4.00	4 50	5.00

Galvernized S. S. & Co., with Wringer Attachment, ₱ doz., No. 10, $6.25; No. 20, $6.75; No. 30.....$7 50

Twine—

Binder—

White Sisal, 500 feet to lb..... 9½c
Standard, 500 feet to lb..... 9½c
Manila, 600 feet to lb.....10½c
Pure Manila, 650 feet to lb.....10½c

Miscellaneous—

	BC	B.
Flax Twine—		
No. 9, ¼ and ½-lb. Balls	20c	24c
No. 12, ¼ and ½-lb Balls	17c	20c
No 18, ¼ and ½-lb. Balls	14c	17c
No. 24, ¼ and ½-lb. Balls	14c	17c
No 36, ¼ and ½-lb. Balls	13c	16c

Chalk Line, Cotton, ½-lb. Balls.....
18@20c
Cotton Mops, 6, 9, 12 and 15 lb. to doz.....8@9c
Cotton Wrapping, 5 Balls to lb.....
9@16c
American 2-Ply Hemp, ¼ and ½-lb. Balls.....9@10c
American 3-Ply Hemp, 1-lb. Balls..
9@10c
American 3-Ply Hemp, 1-lb. Balls (Spring Twine).....10@11c
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine)......8c
India 3-Ply Hemp, 1-lb Balls.....8c
India 3-Ply Hemp, 1½-lb. Balls.....
7@7½c
*2, 3, 4 and 5-Ply Jute, ½-lb. Balls.*6½c
Mason Line, Linen, ½-lb. Balls...12c
No. 264 Mattress, ¼ and ½-lb. Balls 8c
Wool.....5@5½c

Vises—

Solid Box.....60@60&10%
Bonney's Saw Vises.....50&10%

Parallel—

Bonney's.....50&5%
Fisher & Norris Double Screw....15&10%
Hollands'.....40@40&10%
Massey's Perfect.....20@25%
Massey's Clincher.....40@40&10%
Merrill's.....25%
Miller's Falls.....45&10%
Parker's.....20@25%
Parker's Oval Slide.....50&10%
Parker's Victor.....30%
Prentiss.....20@25%
Sargent's.....70&10@70&10&10%
Simpson's Adjustable.....40%
Stephens'.....25@30%
Toles' Woodworking.....25%
Trenton.....40&3%40&10%

Saw Filers—

Bonney's, Nos. 2 & 3, $15.00.....50&10%
Disston's D 3 Clamp and Guide, ₱ doz $40.....25%
Reading.....40&10%
Stearns' Common, Nos. 0, 1, 2 & 3....50%
Stearns' Rubber Jaw, Nos. 10 & 33.33⅓%
Wentworth's Rubber Jaw, Nos. 1, 2 and 3.....40%

Miscellaneous—

Bignall & Keeler Combination Pipe Vise.....60&5%
Parker's Combination Pipe:
87 Series.....60%
187 Series.....60&5%
No. 870.....40%

Wads—Price Per M.

B. E., 11 up	.60c
B. E., 9 and 10	.70c
B. E., 8	.80c
B. E., 7	.80c
P. E., 11 up	$1.00
P. E., 9 and 10	1.25
P. E., 8	1.50
P. E., 7	1.50
Ely's B E., 11 and larger	$1.70@1.75
Ely's P. E., 12 to 20	$3.00@3.25

Dis. 20&2½

Wagon Boxes—

See *Boxes, Wagon.*

Wagon Jacks—

See *Jacks, Wagon.*

Ware, Hollow—

Aluminum—
S. S. & Co. Reduced List.....40%

Cast Iron, Hollow—

Stove Hollow Ware:
Ground.....60&10@60&10&10%
Unground.....70&5@70&10%
White Enameled Ware:
Moslin Kettles.....75&10&5@30%
Boilers and Saucepans...60@60&5%
*Tinned Boilers and Saucepans.*60&5%
See also *Pots, Glue.*
Note.—See Trade Report.

Enameled—

Agate and Granite Ware, list Jan. 1, '94, revised Jan. 2, '95.....40&10%
Second Quality.....70&10@70&10&10%
Ironclad Enameled Ware, Old list...70%
Never Break Enameled.....50&10%

Tea Kettles—

Galvanized Tea Kettles:				
Inch	6	7	8	9
Each	.40c	45c	50c	60c

Steel Hollow Ware.

Avery Spiders & Griddles.....70@70&5%
Avery Kettles.....60@60&10%
Never Break Spiders and Griddles.....
70@70&5%
Never Break Kettles.....60@60&10%
Solid Steel Spiders & Griddles. 70@70&5%
Solid Steel Kettles.....60@60&10%
Solid Steel Ware, Enameled.....50&10%

Silver Plated Hollow—

William Rogers Mfg. Co.....40&10&5%

Washboards—

Solid Zinc:	₱ doz
Crescent, family size, bent frame	$2.75
Red Star, laundry size, stationary protector	4.00
Double Zinc Surface:	
Diamond, family size, stationary protector	$2.75
Saginaw Globe, family size, stationary protector	$2.50
Wilson, family size, bent frame	$2.50
Single Zinc Surface:	
Nalad, protector, family size, open back perforated	$2.15
Diamond, protector family size, ventilated back	$2.10
Saginaw Globe, protector, family size, ventilated back	$2.00
Wilson, bent frame, family size, ventilated back	$2 00
Eagle, protector, family size, ventilated back	$1 85

Washers—
Leather, Axle—

Solid.....80&10&10@85%
Patent.....85@85&5%
Coil: ⅛ 1 1¼ 1½ *Inch.*
13c 14c 15c 17c *per 100*

Iron or Steel—

Size bolt ... 5-16 ⅜ ½ ⅝ ¾
Washers....$4.75 3.50 2.75 2.50 2.50
In lots less than one keg add ¼c per lb., 5-lb. boxes add ½c to list.

Washer Cutters—
See *Cutters, Washer.*

Washing Machines—
See *Machines, Washing.*

Water Coolers—
See *Coolers, Water.*

Weaners—
Tyler's New Hatter—No. 1 ₩ doz. $3.45; No. 2, $3.70; No 3, $4.00; No. 4, $4 80
Tyler's Safety—Nos. 1 and 2, ₩ doz. $4.70; No. 3, $2.00; No. 4, $2 30.

Weather Strips—See *Strips, Weather.*

Wedges—
Oil Finish.....*lb.* 2.70@2.85c
Axe Finish.....*lb.* 3.00@3.10c

Weights, Sash
Eastern: Carloads at factory..$17.00
Less than carloads at factory.$18.00
Western: Carloads at factory ... $17.50@18.00
Less than carloads at factory ... $18.50@19.00
Note—Some Foundries are naming higher prices.

Well Buckets, Galvanized
See *Pails, Galvanized.*

Wheels, Well—
8-in., $2 00; 10-in., $2.50; 12-in., $2.75

Wire and Wire Goods—
Market: Nos. 0 to 13:
Br. & Ann .....75&7½@75&10%
Cop'd.....72½@72½&5%
Galv.....72½@72½&5%
Tin'd, Tin'd list....75&7½@75&10%
Stone, Br. and Ann'd:
Nos. 16 to 13 } *Quotations*
Nos. 19 to 26 } *nominal.*
Nos. 27 to 36 }
Annealed Wire on Spools.....
60&10@60&10&5%
Brass, list Feb. 26, '96.....15%
Copper, list Feb. 26, '96.....20%
Cast Steel Wire.....50%
Steel Music Wire, 12 to 20, imported.. lb. 60@70c
Stubs' Steel Wire.....$6.00 to 2, 40%
Wire Clothes Line, see *Lines.*
Wire Picture Cord, see *Cord.*

Bright Wire Goods—
Iron and Brass, list April 1, 1899... 10&10@50%
Note.—The old high list is still used by many merchants, dis 90@90&..%

Wire Cloth and Netting—
Galvanized Wire Netting..... 80&10@80&10&10%
Painted Screen Cloth per 100 ft .. 1 15@ ..
See Trade Report.

Wire Barb—See *Trade Report.*

Wire, Rope—See *Rope, Wire.*

Wrenches—
Agricultural.....80&5@80&10%
Baxter's S.....70@70&5%
Coes' Genuine.....40&10&5&5&3%
Coes' "Mechanics".....40&10&10&5&5&3%
Acme.....60@60&5%
Aiken's Pocket (Bright).....$2.00@3.20
Alligator.....70@70&10%
Bemis & Call's:
Adjustable S.....35&5%
Adjustable S Pipe.....40%
Brigg's Pattern.....30&10%
Combination Black.....40&10%
Combination Bright.....40&5%
Cylinder or Gas Pipe.....55%
Extra Heavy.....45%
Merrick's Pattern.....50%
No. 3 Pipe, Bright.....50%
Boardman's.....33⅓%
Bull Dog, W. & B.....70@70&10%
Donohue's Engineer.....40&10%
Eagle.....50&10%
Hercules.....70&10@75%
Stevenson.....60@10&10%

Wrought Goods—
Staples, Hooks, &c., list March 17, '93.....85&10@90%

Yokes, Neck—
Covert Saddlery Works, Trimmed...70%
Covert Saddlery Works, Neck Yoke Centers.....70%

Yokes, Ox, and Ox Bows—
Fort Madison's Farmers & Freighters'.....20%

Zinc—
Sheet.....*lb.* 8¼c

PAINTS, OILS AND COLORS.—Wholesale Prices.

White Lead, Zinc, &c.
Lead, Foreign white, in Oil... 8 @8¼
Lead, American White, in Oil:
Lots of 500 ₰ or over..... 5¼@ 5¾
Lots less than 500 ₰..... .. @ 6¼
Lead, White, in oil, 25 ₰ tin pails, add to keg price..... .. @ ⅛
Lead, White, in oil, 12½ ₰ tin pails, add to keg price..... .. @ 1
Lead, White, in oil, 1 to 5 ₰ assorted tins, add to keg price.. .. @ 1¼
Lead White, Dry in bbls..... .. @ 5
Lead, American. Terms: On lots of 500 lbs. and over, 60 days, or 2% for cash if paid in 15 days from date of invoice.
Zinc, American, dry..... ₩ ₰ 3¼@ 4¼
Zinc, French, S. & B. Red Seal... @ 7½
Zinc, French, S. & B. Green Seal ..@7 7-10
Zinc, Paris, Red Seal..... .. @ 8½
Zinc, Paris, Green Seal..... .. @ 9½
Zinc, Antwerp, Red Seal..... .. @ 7½
Zinc, Antwerp, Green Seal..... .. @ 8½
Zinc, V. M. in Poppy Oil, G. Seal lots of 1 ton and over..... .. @10¼
lots less than 1 ton..... .. @10¾
Zinc, V.M. in Poppy Oil, Red Seal, lots of 1 ton and over..... .. @ 9¼
lots of less than 1 ton..... .. @ 9½
DISCOUNTS.—V. M. French Zinc.—Discounts to buyers of 10 bbl. lots of one or assorted grades, 1%; 25 bbls., 2%; 50 bbls., 4%. No discount allowed on less than 10 bbl. lots.

Dry Colors.
Black, Carbon.....₩ ₰ 5 @40
Black, Drop, Amer..... 2½@ 5
Black, Drop, Eng..... 5 @10
Black, Ivory .....10 @90
Blue, Celestial..... ₩ ₰ 6 @ 8
Blue, Chinese.....30 @35
Blue, Prussian.....28 @32
Blue, Ultramarine..... 5 @30
Brown, Spanish..... ½@ 1
Brown, Vandyke, Amer..... 1¾@ 2¼
Brown, Vandyke, Foreign..... 2½@ 5
Carmine, No. 40, in bulk.....$2.20@2.25
Carmine, No. 40, in ₰ bottles. 2.35@ ..
Carmine, No. 40, in ounce bot. 3.50@3.60
Green, Chrome, ordinary..... ₰ @10
Green, Chrome, pure.....18 @24
Lead, Red, bbls. and ½ bbls..... .. @ 5¾
Lead, Red, kegs..... .. @ 6
Litharge, bbls. and ½ bbls..... .. @ 5¾
Litharge, kegs..... .. @ 6
Ocher, French Washed..... 1 @ 1¾
Ocher, German Washed..... 4½@ 5
Ocher, American .... ₩ ton $8.00@17.00
Orange Mineral, English.. ₩ ₰ 8¼@ 9¼
Orange Mineral, French.....10½@10¾
Orange Mineral, German..... 8½@ 8¾
Orange Mineral, American .... .. @ 7¾
Red, Indian, English..... 4½@ 8½
Red, Indian, American ..... 2½@ 3
Red, Turkey..... 4½@ 8
Red, Tuscan..... 7 @14
Red, Venetian, Amer., ₩ 100 ₰..60 @70
Red, Venetian, English.....$1.00@2.00
Sienna, Italian, Burnt and Powdered..... ₩ ₰ 4 @ 9¼
Sienna, Ital., Raw, Powd..... 2½@ 7
Sienna, American, Raw..... 1¼@ 1½
Sienna, American, Burnt and Powdered ..... ₩ ₰ 1¼@ 1½
Talc, French..... ..₩ 100 ₰ 90 @1.50
Talc, American..... .40 @65
Terra Alba, French, ₩ 100 ₰.. 90 @1.00
Terra Alba, English..... 75 @80
Terra Alba, American No. 1.....85 @75
Terra Alba, American No. 2....45 @50
Umber, Turkey, Bat. & Pow. ₩ ₰ 2½@ 3
Umber, Turkey, Raw & Powd. 2½@ 3
Umber, Bat. Amer..... 1½@ 1½
Umber, Raw, Amer..... 1½@ 1½
Yellow, Carome.....10 @25
Vermilion, American Lead..... .. @10
Vermilion, Quicksilver, bbls. or kegs..... .. @61
Vermilion, Quicksilver, bags.... .. @62
Vermilion, Quicks'r, sm'r pkgs.. .. @67
Vermilion, English, Import.. .70 @75
Vermilion, Artificial..... 5 @90
Vermilion Chinese.....70 @75

Colors in Oil.
Black, Lampblack, Best..... 10 @13
Black, Lampblack, Common.. 7 @ 9
Blue, Chinese..... .....35 @40
Blue, Prussian.....25 @35
Blue, Ultramarine.....16 @20
Brown, Vandyke..... 7 @13
Green, Chrome..... 7 @11
Green, Paris.....17 @22
Sienna, Raw..... 7 @10
Sienna, Burnt..... 7 @10
Umber, Raw..... 6 @10
Umber, Burnt..... 7 @10

Miscellaneous.
Barytes, Foreign, ₩ ton....$18.00@20.00
Barytes, Amer. floated..... 18.00@20.00
Barytes, Crude..... 8.00@10.00
Chalk, in bulk.....₩ ton 2.00@ ..
Chalk, in bbls.....₩ 100 ₰ 35@ ..
China Clay, English..₩ ton 10.00@17.50
Cobalt, Oxide.....₩ 100 ₰ ....@ 1.70
Whiting, Common. ₩ 100 ₰..30@ .40
Whiting, Gilders..... .40@ .45
Whiting, extra Gilders'.... @ 55%
Paris Green:
Arsenic, kegs or casks.....12 @13
Kegs, 100 ₰ @ 175 ₰.....12¼@13¼
Kits, 14, 28, 56 ₰.....13¼@14½
Paper Boxes, 2 @ 5 ₰.....13½@14½
Paper Boxes, 1 ₰..... 14 @15
Paper Boxes, ½ ₰..... 15 @16
Paper Boxes, ¼ ₰..... 16 @17

Putty.
In barrels and ½ bbls..... 1 4-10@ 1½
In tubs..... 1½@1 6-10
In tin cans..... 1½@ 2
In bladders..... 1½@ 2

Spirits Turpentine.
In Southern bbls..... .. @43 ¢
In machine bbls..... .. @42½¢

Glue.
Low Grade.....₩ ₰ 7 @ 9
Cabinet.....11 @15
Medium White.....10 @15
Extra White.....15 @25
French.....10 @25
Irish.....10 @12½

Animal Fish and Vegetable Oils.
Linseed, City, raw.....₩ gal. 49 @50
Linseed, City, boiled.....51 @52
Linseed, Western, raw .....43 @46
Linseed raw Calcutta seed.....@58
Lard, Prime City, present make43 @45
Lard, Extra No. 1..... ....35 @37
Lard, No. 1.....30 @32
Cotton-seed, Crude.....22 @22½
Cotton-seed, Summer Yellow, prime.....26½@27
Cotton-seed Summer Yellow, off grades..... .. ..25½@26
Sperm, Crude.....50 @52
Sperm, Natural Spring.....53 @55
Sperm, Bleached Spring.....58 @60
Sperm, Natural Winter..... .....@57
Sperm, Bleached Winter.....62 @65
Whale, Crude..... .. @ ..
Whale, Natural Winter..... .. @46
Whale, Bleached Winter..... .. @49
Whale, Extra Bleached Win.... .. @52
Menhaden, Crude, Sound.....24 @25
Menhaden, Light Pressed.....29 @30
Menhaden, Bleached Winter.... ..@41
Menhaden, Extra Bleached....34 @ ..
Tallow, Western, prime.....42 @43
Cocoanut, Ceylon..... 5¾@ 6
Cocoanut, Cochin..... 6¼@ 6¾
Cod, Domestic..... .34 @36
Cod, Newfoundland.....34 @40
Red Elaine.....28 @30
Red Saponified.....₩ ₰ 4 @ 4¾
Bank.....₩ gal. .. @27
Straits..... .. @28
Olive, Italian, bbls..... 58 @60
Neatsfoot, prime..... .42 @45
Palm, prime, Lagos.....₩ ₰ 5½@ 5¼

Mineral Oils.
Black, 29 gravity, 25@30 cold test.....₩ gal. .. @ 7½
Black, 29 gravity, 15 cold test. .. @ 8½
Black, summer..... .. @ 7
Cylinder, light filtered..... 13 @15½
Cylinder, dark filtered..... 11 @16
Paraffine, 23½@24 gravity..... 8¾@ 9
Paraffine, 25 gravity..... .. @ 8¼
Paraffine, 28 gravity..... .. @ 7½
Paraffine, red, No. 1..... .. @ 8¾
In small lots ½¢ advance.

THE IRON AGE.

The oldest paper in the world devoted to the interests of the Hardware, Iron and Metal Trades, and a standard authority on all matters relating to those branches of industry.

RATES OF SUBSCRIPTION: INCLUDING POSTAGE.

UNITED STATES AND BRITISH AMERICA.

Regular Edition, Issued every THURSDAY morning, - - - - - - - - - - - $4.50 a year.
Two Dollar Edition, large number FIRST and THIRD THURSDAYS of every month, Bulletin number each intervening Thursday, 2.00 "
Dollar Edition, large number FIRST THURSDAY of every month, Bulletin number each intervening Thursday, - - 1.00 "

RATES OF ADVERTISING: ONE INCH.

ONE INSERTION, - - - - - - -	$2.40	SIX MONTHS, - - - - - - -	$36.00
ONE MONTH, (5 times) - - - - - -	9.00	ONE YEAR, - - - - - - - -	60.00
THREE MONTHS, - - - - - - -	21.00	Rates for larger spaces quoted on application.	

New York (Main Office), - - 232-238 William Street, - - - - - - DAVID WILLIAMS CO., Pub'rs.
Philadelphia, - - - - - - - Forrest Building, 117-119 South Fourth Street, - - THOMAS HOBSON, Manager.
Pittsburgh, - - - - - - - Hamilton Building, 335 337 Fifth Avenue, - - ROBERT A. WALKER, Manager.
Chicago, - - - - - - - - Fisher Building, Dearborn and Van Buren Streets, - { H. H. ROBERTS, Business Manager. / GEO. W. COPE, Resident Asso. Ed.
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BRITISH AGENCY: Office of *The Ironmonger*, 42 Cannon Street, London.
AUSTRALIAN OFFICES: Melbourne, Hardware Chambers, 231 Elizabeth Street; Sydney, 114a Pitt Street.

Remittances should be made by draft, payable to the order of DAVID WILLIAMS COMPANY, on any banking house in the United States or Europe, or by P. O. Money Order on New York. When these cannot be obtained, postage stamps of any country will be received.
Newsdealers or Booksellers in any part of the world may obtain *The Iron Age* through The American News Company, New York, U. S. A.; The International News Company, New York, U. S. A., and London, England; or The San Francisco News Company, San Francisco, Cal., U. S. A.

Entered at the Post Office, New York, as Second-class Matter.

CURRENT METAL PRICES.

MAY 17, 1899.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from Store—

Common Iron: Duty, Round, 0.6¢ ₩ ℔; Square, 0.8¢ ₩ ℔	
1 to 1¼ in. round and square... } 1¼ to 4 in. x ⅜ to 1 in..... }	₩ ℔ 1.80¢ @ 1.90¢
Refined Iron:	
1 to 1¼ in. round and square.. } 1¼ to 4 in. x ¼ to 1 in..... }	₩ ℔ 1.85¢ @ 1.95¢
1¼ to 4 in. x ¼ to 5-16.....	₩ ℔ 2.05¢ @ 2.15¢
Angles	2.10¢
Tees	2.20¢
Beams	2.25¢
Channels	2.25¢
Rods—¾ and 11-16 round and sq'e.	₩ ℔ 2.05¢ @ 2.15¢
Bands—1 to 6 x 3-16 to No. 12	₩ ℔ 2.45¢ @ 2.60¢
"Burden's Best" Iron, base price..	₩ ℔ ..... 2.80¢
Burden's "H. B. & S. Iron, base price	₩ ℔ 2.60¢
"Ulster"	₩ ℔ 2.80¢
Norway Bars	3.50 @ 4.00¢
Norway Shapes	4.00 @ 4.25¢

Merchant Steel from Store—

	per ℔
Open Hearth and Bessemer Machinery	2.00 to 2.10¢
Toe Calk, Tire and Sleigh Shoe	2¾ to 3 ¢
Best Cast Steel, base price in small lots	7 ¢
Best Cast Steel Machinery, base price in small lots	5 ¢

Soft Steel Sheets—

¼ inch	2.50¢	No. 14	2.70¢
8-16 inch	2.60¢	No. 16	2.80¢
No. 8	2.80¢	No. 18	2.90¢
No. 10	2.80¢	No. 20	2.95¢
No. 12	2.65¢	No. 22	3.00¢

Sheet Iron from Store.

Black.

	Common American.	R. G. Cleaned American.
Nos. 10 to 16	₩ ℔, 2.70	2.90¢
Nos. 17 to 21	₩ ℔, 2.80	3.00¢
Nos. 22 to 24	₩ ℔, 2.90	3.10¢
Nos. 25 and 26	₩ ℔, 3.00	3.20¢
No. 27	₩ ℔, 3.10	3.30¢
No. 28	₩ ℔, 3.20	3.40¢

Russia, Planished, &c.

Genuine Russia, according to assortment	₩ ℔ 10½¢
Patent Planished	₩ ℔ A, 9¾¢; B, 8¾¢, net.
Patent Planished Sheet Steel	₩ ℔ 8¾¢

Galvanized.

	B. B.
Nos. 10 to 16	₩ ℔, 12¢
Nos. 17 to 21	₩ ℔, 13¢
Nos. 22 to 24	₩ ℔, 14¢
Nos. 25 to 26	₩ ℔, 15¢
No. 27	₩ ℔, 16¢
No. 28	₩ ℔, 17¢
No. 29	₩ ℔, 19¢
No. 30	₩ ℔, 21¢

70&5% off.

36 in. 1¢ ₩ ℔ higher.

Foreign Steel from Store—

Best Cast	₩ ℔ 14 ¢
Extra Cast	₩ ℔ 16½ @ 17 ¢
Swaged, Cast	₩ ℔ 16 ¢
Best Double Shear	₩ ℔ 14 ¢
Blister, 1st quality	₩ ℔ 12 ¢
German Steel, Best	₩ ℔ 10 ¢
2d quality	₩ ℔ 9 ¢
3d quality	₩ ℔ 8 ¢
Sheet Cast Steel, 1st quality	₩ ℔ 14 ¢
2d quality	₩ ℔ 13 ¢
3d quality	₩ ℔ 11 ¢
R. Mushet's "Special"	₩ ℔ 46 ¢
" " " Annealed	₩ ℔ 75 ¢
" " "Titanic"	₩ ℔ 19 ¢
Hobson's Choice XX Extra Best	₩ ℔ 35 ¢
Jessop Self Hardening	₩ ℔ 40 ¢
Seamans' "Nelson" Steel	40 ¢
Hobson Self-Hardening	₩ ℔ 40 ¢

METALS—

Tin—

Duty.—Pigs, Bars and Block. Free.	Per ℔
Banca, Pigs	28¢
Straits, Pigs	27¢
Straits in Bars	28¢

Tin Plates—

American Charcoal Plates.

Calland Grade:	
IC, 14 x 20	$6.25@6.50
IX, 14 x 20	7.75@8.00
Melyn Grade:	
IC, 14 x 20	6.00
IX, 14 x 20	7.25
Allaway Grade:	
IC, 14 x 20	5.25
IX, 14 x 20	6.25

American Coke Plates—Bright—

IC, 14 x 20 ..... 108 ℔	$4.50@4.60
IX, 14 x 20	5.40@5.50
IXX, 14 x 20	6.05@6.15

American Terne Plates—

IC, 20 x 28	$8.50@ 9 00
IX, 20 x 28	10.5 @11.00

Tin Boiler Plates, American—

IXX, 14 x 20 ..... 112 sheets	$10.50
IXX, 14 x 28 ..... 112 sheets	11.45
IXX, 14 x 31 ..... 112 sheets	12.65

Copper—

DUTY: Pig, Bar and Ingot and Old Copper free Manufactured, 2½¢ ₩ lb.

Ingot—

Lake	21½¢
Ansonia grade Casting	20½¢

Sheet and Bolt—

February 2, 1899. Prices, in cents per pound. Net.

Sheet 30 x 60.

Not wider than	Not longer than	And longer than	64 oz. & over, 50 lb. sheet, 30 x 60 and heavier.	39 oz. to 64oz., 25 to 50 lb.	24 oz. to 39 oz. 18¾ to 25 lb.	16 oz. to 24 oz. 12½ to 18¾ lb.	14 oz. and 15 oz. 11 to 12½ lb.	13 oz. and 13 oz. 9⅝ to 11 lb.	10 oz. and 11 oz. 7½ to 9⅝ lb.	8 oz. and 9 oz. 6¼ to 7½ lb.	Lighter than 8 oz.
Ins.	Ins.	Ins.									
30	72	.....	28½	28½	29½	22½	23½	24½	25½	28½	31½
30	96	72	22½	22½	23½	23½	24½	25½	30½	31½	
30	.....	96	22½	22½	23½	24½	25½	26½	28½		
36	72	.....	22½	22½	23½	24½	25½	26½	30½	32½	
36	96	72	22½	22½	23½	24½	25½	28½	31½		
36	120	96	22½	22½	23½	25½	26½				
36	.....	120	22½	22½	23½	25½	27½				
48	72	.....	22½	22½	23½	24½	26½	29½	32½		
48	96	72	22½	22½	23½	25½	27½	30½			
48	120	96	22½	22½	24½	26½	30½				
48	.....	120	22½	23½	25½	28½					
60	72	.....	22½	23½	23½	25½	28½	33½			
60	96	72	22½	23½	24½	26½	31½				
60	120	96	22½	23½	25½	28½					
60	.....	120	22½	24½	26½	30½					
72	96	.....	22½	23½	25½	30½					
72	144	96	22½	24½	27½	32½					
72	.....	144	23½	25½	30½						
108	120	.....	23½	25½	31½						
108	.....	120	25½	26½							
wider than 108	144	.....	26½	28½							
	.....	144	27½	30½							

Bolt Copper, ⅝ inch diameter and over, ₩ ℔ 23½¢

Circles, Segments and Pattern Sheets, 3¢ ₩ ℔ advance over price of Sheet Copper required to cut them from.

Cold or Hard Rolled Copper. 14 oz. ₩ square foot and heavier, 1¢ ₩ ℔ over the foregoing prices.

Cold or Hard Rolled Copper, lighter than 14 oz. ₩ square foot, 2¢ ₩ ℔ over the foregoing prices.

All Polished Copper, 20 in. wide and under, 1¢ ₩ ℔ advance over the price for Cold Rolled Copper.

All Polished Copper, over 20 in. wide, 2¢ ₩ ℔ advance over the price for Cold Rolled Copper.

Planished Copper—

1¢ ₩ ℔ more than Polished Copper.

Copper Bottoms, Pits and Flats—

14 oz. to square foot and heavier, ₩ ℔	26½¢
12 oz. and up to 14 oz. to square foot, ₩ ℔	27½¢
10 oz. and up to 12 oz., ₩ ℔	29½¢
Lighter than 10 oz., ₩ ℔	33½¢

Circles less than 8 in. diameter, 2¢ ₩ ℔ additional.

Circles over 13 in. diameter are not classed as Copper Bottoms.

Copper Wire—

Hard and Soft Drawn—B. & S. Gauge.

Nos.	0000 to 8	9 and 10	11 and 12
	20¢	20½¢	20½¢

Nos.	13	14	15	16
	20½¢	20¾¢	21¢	21½¢
Nos.	17	18	19	20
	21½¢	22¢	22½¢	23¾¢

Seamless Brass Tubes—

Standard always Stubs' gauge, unless otherwise ordered.

Feb. 6, 1899. Net. Outside Diameter.

Stubs' W. G.	B. & S. W. G.	¼	5-16	⅜	7-16	½	9-16	⅝	¾	⅞	1	1¼	1½
4-11	3- 9	.....	.....	.....	.....	33	31	30	29	28	27	25	24
12	10	.....	.....	37	35	33	31	30	29	28	27	25	24
13	11	.....	.....	37	35	33	31	30	29	28	27	25	24
14	12	.....	41	37	35	33	31	30	29	28	27	25	24
15	13	.....	42	38	36	33	32	31	30	30	28	26	25
16	14	.....	43	39	37	34	33	32	31	30	29	26	25
17	15	.....	44	40	38	35	34	33	32	31	30	27	26
18	16	61	46	42	39	36	35	34	32	31	30	28	27
19	17	62	47	43	40	37	36	35	34	33	32	30	29
20	18-19	64	49	44	41	39	38	37	36	35	34	32	31
21	20	66	51	46	43	41	40	39	38	37	36	35	34
22	21	71	56	48	44	42	41	40	39	38	37	37	36
23	22	76	61	50	46	44	43	42	41	40	39	39	39
24	23	81	66	53	48	46	45	44	43	41	40	40	41
25	24	86	71	56	51	49	47	46	45	43	43	44	45

Copper Bronze and Gilding Tube, 3¢ ₩ ℔ additional

Iron Pipe Sizes—Brass

⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6 inch
36	32	30	27	21	21	21	21	21	21	21	23	23	25	27	28¢₩℔

Copper, Bronze or Gilding Tubes, 3¢ ₩ ℔ additional

Brazed Brass Tubing.

(*To No. 19, inclusive.*) Feb. 26 1896

Brown & Sharpe's gauge standard.

	Per ℔.
Plain Round Tube, ¼ in. up to 2 in.	$0.35
" " ⅜ " ¾ "	.36
" " ½ " ¾ "	.38
" " 5-16 " ⅞ "	.41
" " ¼ " 5-16 "	.48
" " 3-16 " ¼ "	1.00
" " ⅛ " 3-16 "	1.50
Smaller than ⅛ inch	Special
3 inch and larger	.40
Over 3 inch to 3½ inch, inclusive	.45
Over 3½ inch	.50

Bronze and Copper, advance on Brass List, 3 cents.

Discount from list ⅝ ..... 20@25%

Roll and Sheet Brass—

(*Brown & Sharpe Standard Gauge.*)

Common High Brass Wider than and including	in. 12	in. 13	in. 14	in. 16	in. 18	in. 20	in. 22	in. 24	in. 26
To No. 20, inclusive	.22	.23	.25	.27	.29	.31	.33	.36	
Nos. 21, 22, 23 and 24	.22	.24	.26	.28	.30	.32	.34	.37	
Nos. 25 and 26	.23	.24½	.27	.29	.31	.33	.35	.38	
Nos. 27 and 28	.25	.25	.28	.30	.32	.34	.36	.39	

Common High Brass. Wider than and including	in. 26	in. 28	in. 30	in. 32	in. 34	in. 36	in. 38	in. 40
	28	30	32	34	36	38	40	
To No. 20, inclusive	.39	.42	.46	.50	.55	.60	.65	*
Nos. 21, 22, 23 and 24	.40	.43	.47	.51	.56	.61	.68	
Nos. 25 and 26	.41	.44	.48	.52	.57	.63	.71	
Nos. 27 and 28	.42	.45	.49	.53	.58	.65	.75	

* Special prices not less than 80 cents.

Add 1¢ ₩ ℔ additional for each number thinner than Nos. 28 to 38 inclusive. Discount from List..... 10%

Wire in Coils. List February 26, 1896.

Brown & Sharpe's gauge the standard.	Com. high brass.	Low brass.	Gild'g bronze and copper
All Nos. to No. 10, inclusive	$0.23	$0.27	$0.28
Above No. 10 to No. 16	.23½	.27½	.28½
No. 17 and No. 18	.24	.28	.32
No. 19 and No. 20	.25	.29	.33
No. 21	.26	.30	.34
No. 22	.27	.31	.35
No. 23	.28	.32	.36
No. 24	.30	.34	.38
No. 25	.32	.36	.40
No. 26	.35	.39	.43
No. 27	.38	.42	.46
No. 28	.42	.46	.51
No. 29	.45	.49	.54
No. 30	.48	.52	.62
No. 31	.51	.55	.67
No. 32	.55	.59	.73
No. 33	.59	.63	.82
No. 34	.64	.68	.95
No. 35	.70	.74	1.30
No. 36	.76	.80	1.50
No. 37	1.00	1.04	1.70
No. 38	1.30	1.34	2.00
No. 39	2.00	2.00	3.25
No. 40	2.60	2.60	5.75

Discount, Brass Wire, 10%; Copper Wire, NET. List November 16, 96.

Spring Wire, 2¢ ₩ ℔ advance.

Spelter—

DUTY: In Blocks or Pigs, 1¢ ₩ ℔.

Western Spelter ..... 7¼@7¾¢

Zinc.

Duty: Sheet, 2¢ ₩ ℔.

600 ℔ casks ..... 8.40¢ | Per ℔ ..... 9¢

Lead.

Duty: Pigs and Bars and Old, 2½¢ ₩ ℔. Pipe and Sheets, 2½¢ ₩ ℔.

American Pig	4¾@4¾¢
Bar	5¼¢
Pipe (full lengths), subject to discount 20%	6¼¢
Pipe (cut lengths), subject to discount 20%	7¼¢
Tin Lined Pipe, subject to discount 20%	12½¢
Block Tin Pipe, subject to discount 20%	37½¢
Sheet (full rolls) subject to discount 20%	7¾¢
Sheet (cut rolls (subject to discount 20%	8¾¢
Old Lead in exchange, 4¢ ₩ ℔.	

Solder.

½ & ¼, guaranteed	17¢
No. 1	15½@16¢

Prices of Solder indicated by private brand vary according to composition.

Antimony—

Duty, ¾¢ ₩ lb.

Cookson	₩ ℔ 11½@12¢
Hallett's	₩ ℔ 10½@10¾¢
U. S	₩ ℔ 10½@10½¢

Aluminum—

Duty: Crude, 8¢ ₩ ℔. Plates, Sheets, Bars and Rods 13¢ ₩ ℔.

No. 1 Aluminum (guaranteed over 99% pure), in ingots for remelting:	
Small lots	₩ ℔ 37¢
100-℔ lots	₩ ℔ 35¢
No. 2 Aluminum (guaranteed to be over 90% pure), in ingots for remelting:	
Small lots	₩ ℔ 34¢
100-℔ lots	₩ ℔ 33¢
Special casting Alloy, containing over 80% pure Aluminum:	
Small lots ..... ₩ ℔ 35¢ | 100-℔ lots	₩ ℔ 30¢
Aluminum Rods, from ⅛-in. diam. to 1 in. diam.	₩ ℔ 53¢
Aluminum Sheet, B. & S. gauge. 50 ℔ or more.	

Wider than	6-in. ₩ ℔.	14-in. ₩ ℔.	24-in. ₩ ℔.
And including	14-in.	24-in.	30-in.
Nos. 13 to 19	$0.38	$0.40	$0.43
No. 20	.40	.42	.45
Nos. 21 to 23	.42	.44	.47
No. 24	.42	.46	.49
No. 25	.43	.47	.50
No. 26	.43	.50	.55
No. 27	.44	.53	.58
No. 28	.44	.53	.60
No. 29	.45	.56	.65
No. 30	.46	.60	.78

Note.—Lots of less than 50 ℔ 5¢ ₩ ℔ extra.

Aluminum Wire, B. & S. Gauge.

Larger than No. 1 ₩ ℔ 55¢	No. 17 to No. 20 ₩ ℔ 80¢
No. 1 to No. 8 ₩ ℔ 60¢	No. 21 ₩ ℔ $1.15
No. 9 to No. 16 ₩ ℔ 65¢	

Old Metals.

Dealers' Purchasing Prices Paid in New York.

Heavy Copper	₩ ℔ 15¾¢
Light and Tinned Copper	₩ ℔ 13¾¢
Heavy Brass	₩ ℔ 11¾¢
Light Brass	₩ ℔ 9½¢
Lead	₩ ℔ 3.95¢
Tea Lead	₩ ℔ 3½¢
Zinc	₩ ℔ 5½¢
No. 1 Pewter	₩ ℔ 17½¢
No. 2 Pewter	₩ ℔ 10 ¢
Tin Plate Scrap	₩ ton $8.50
Wrought Scrap Iron	₩ gross ton $9.75
Heavy Cast Scrap	₩ gross ton $8.50
Stove Plate Scrap	₩ gross ton $6.00
Burnt Iron	₩ gross ton $8.50